

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-078996

(43)Date of publication of application : 19.03.2002

(51)Int.Cl.

D05B 39/00  
B60R 21/16

(21)Application number : 2000-271340

(71)Applicant : MATSUYA R & D:KK

(22)Date of filing : 07.09.2000

(72)Inventor : GOTO HIDETAKA

SAKO TATSUO

HASEGAWA KATSUTO

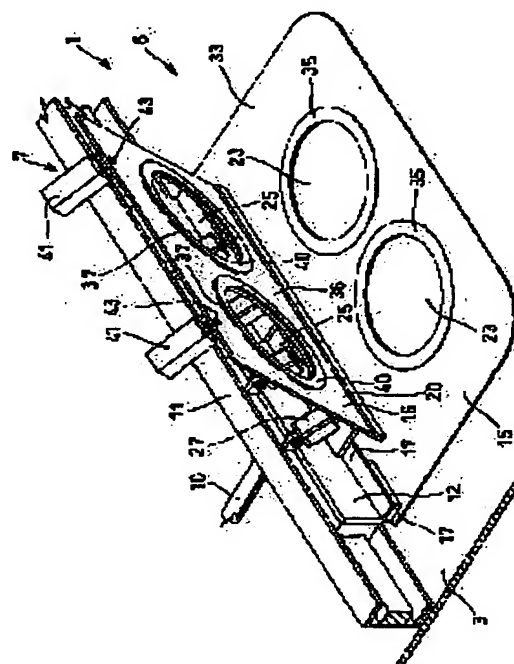
## (54) DEVICE FOR ATTRACTION HOLDING AND RELEASING OF MATERIAL TO BE SEWN PROVIDED TO NC SEWING MACHINE

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To improve sewing operation efficiency and to reduce sewing costs by reducing the time of sewing operations with an NC sewing machine.

**SOLUTION:** The NC sewing machine is provided with an attraction holder 6 which can flexibly move in two-dimensional directions on its table surface 3. The attraction holder 6 is composed of a first holding plate 15 which can open and close and a second holding plate 16 which is overlapped and connected onto it in such a way that they can open and close. A material to be sewn is held between the closed holding plates 15 and 16 by the attraction of permanent magnets 37.

Also, the NC sewing machine is provided with an attraction releasing device 7 which releases the attraction of the permanent magnets 37. The attraction releasing device 7 has releasing cylinders 41 on both sides of the extremity end of the second holding plate 16 and the space between the holding plates 15 and 16 is increased by protruding the extremity of their rods, and as a result, the attraction of the permanent magnets 37 is released.



## LEGAL STATUS

[Date of request for examination]

27.09.2001

[Date of sending the examiner's decision of rejection] 30.11.2004

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

\* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

CLAIMS

---

[Claim(s)]

[Claim 1] The adsorption holder which was attached in the migration equipment attached to this NC sewing machine, and was formed free [ migration ] in the direction of two dimension in the table side top of NC sewing machine and which holds a sewing-ed object by adsorption of a permanent magnet, It has adsorption discharge equipment of which adsorption of this permanent magnet is canceled. Said adsorption holder It has the 2nd pinching plate which overlaps on it the 1st pinching plate which can move in the condition of having been laid in said table side in this table side top. Both pinching plates of both [ this ] Do to unification being possible in the lap condition by adsorption of the permanent magnet prepared for the one side or its both sides. It is made as [ pinch / said sewing-ed object / by this adsorption / between both pinching plates ]. To said 2nd pinching plate In the condition [ that the protrusion object which can project is established towards said 1st pinching plate, and this adsorption holder is attached in said migration equipment ] By said protrusion object's projecting and pressing said 1st pinching plate, spacing between both pinching plates is expanded by the relief of said 2nd pinching plate, and adsorption of said permanent magnet is canceled. Adsorption maintenance / adsorption discharge equipment of the sewing-ed object attached to NC sewing machine characterized by constituting so that the 2nd pinching plate can be opened, where this adsorption is canceled.

[Claim 2] while pivoting said 1st pinching plate and said 2nd pinching plate possible [ closing motion ] by the end face side -- this -- adsorption maintenance / adsorption discharge equipment of the sewing-ed object attached to NC sewing machine according to claim 1 characterized by preparing said protrusion object in the both sides of the drawer back part of the 2nd pinching plate.

[Claim 3] Adsorption maintenance / adsorption discharge equipment of the sewing-ed object which a cylinder is fixed to said 2nd pinching plate, and is attached to NC sewing machine according to claim 1 or 2 characterized by the thing which it consisted of as a part for the point of the rod, and for which it projects and the body is made by expanding of this cylinder towards said 1st pinching plate as a protrusion is possible.

[Claim 4] The adsorption holder which was attached in the migration equipment attached to this NC sewing machine, and was formed free [ migration ] in the direction of two dimension in the table side top of NC sewing machine and which holds a sewing-ed object by adsorption of a permanent magnet, It has adsorption discharge equipment of which adsorption of this permanent magnet is canceled. Said adsorption holder It has the 2nd pinching plate which overlaps on it the 1st pinching plate which can move in the condition of having been laid in said table side in this table side top. Both pinching plates of both [ this ] He laps by adsorption of the permanent magnet prepared for the one side or its both sides, and do to unification being possible in the condition. It is made as [ pinch / said sewing-ed object / by this adsorption / between both pinching plates ]. Moreover, said adsorption holder In case a sewing-ed object is set between the 1st pinching plate and the 2nd pinching plate, or in case the object by which sewing was carried out is removed While being constituted so that it may move to the necessary location on said table side, an insertion pore is prepared in the necessary part of said 1st pinching plate. In the necessary part of the table of said NC sewing machine By said protrusion object's projecting in the condition [ that come to prepare the protrusion object which can project towards said 2nd pinching plate through said insertion pore, and this adsorption holder is attached in said migration equipment ], and having floated said 2nd

pinching plate Adsorption maintenance / adsorption discharge equipment of the sewing-ed object attached to NC sewing machine characterized by constituting so that the 2nd pinching plate can be opened, where adsorption of said permanent magnet was canceled and this adsorption is canceled.

[Claim 5] while pivoting said 1st pinching plate and said 2nd pinching plate possible [ closing motion ] by the end face side -- this -- adsorption maintenance / adsorption discharge equipment of the sewing-ed object attached to NC sewing machine according to claim 4 characterized by preparing said insertion pore in the both sides of the drawer back part of the 1st pinching plate.

[Claim 6] Adsorption maintenance / adsorption discharge equipment of the sewing-ed object which a cylinder is fixed to the table of said NC sewing machine, and is attached to NC sewing machine according to claim 5 characterized by the thing which it consisted of as a part for the point of the rod, and for which it projects and the body is made by expanding of this cylinder towards said 2nd pinching plate through said insertion pore as a protrusion is possible.

[Claim 7] The adsorption holder which was attached in the migration equipment attached to this NC sewing machine, and was formed free [ migration ] in the direction of two dimension in the table side top of NC sewing machine and which holds a sewing-ed object by adsorption of a permanent magnet, It has adsorption discharge equipment of which adsorption of this permanent magnet is canceled. Said adsorption holder It has the 2nd pinching plate which overlaps on it the 1st pinching plate which can move in the condition of having been laid in said table side in this table side top. Both pinching plates of both [ this ] He laps by adsorption of the permanent magnet prepared for the one side or its both sides, and do to unification being possible in the condition. It is made as [ pinch / said sewing-ed object / by this adsorption / between both pinching plates ]. Moreover, the interruption protrusion object to which spacing between both pinching plates is made to expand by advancing into the edge joint of both the pinching plate in said unification condition is attached to said NC sewing machine. When this interruption protrusion object interrupts and advances into said joint in the condition [ that said adsorption holder is attached in said migration equipment ], adsorption of said permanent magnet is canceled. Adsorption maintenance / adsorption discharge equipment of the sewing-ed object attached to NC sewing machine characterized by constituting so that the 2nd pinching plate can be opened, where this adsorption is canceled.

[Claim 8] In the condition of opening for sewing being prepared in said 1st pinching plate and the 2nd pinching plate in the state of opposite, being constituted so that said double door opening may carry out abbreviation agreement, after both the pinching plate has pinched the sewing-ed object, and having agreed in this way Do so that the permanent magnet arranged at the inside of the 2nd pinching plate sticks to said 1st pinching plate. Adsorption maintenance / adsorption discharge equipment of the sewing-ed object attached to NC sewing machine according to claim 1 to 7 characterized by being constituted so that a sewing-ed object may be pinched between both pinching plates by this.

[Claim 9] In the condition of opening for sewing being prepared in said 1st pinching plate and the 2nd pinching plate in the state of opposite, being constituted so that said double door opening may carry out abbreviation agreement, after both the pinching plate has pinched the sewing-ed object, and having agreed in this way Do so that the permanent magnet arranged at the periphery part of said opening of the inside of the 2nd pinching plate sticks to the periphery part of opening of said 1st pinching plate. Adsorption maintenance / adsorption discharge equipment of the sewing-ed object attached to NC sewing machine according to claim 1 to 7 characterized by being constituted so that a sewing-ed object may be pinched between both pinching plates by this.

[Claim 10] Said permanent magnet is adsorption maintenance / adsorption discharge equipment of the sewing-ed object attached to NC sewing machine according to claim 1 to 9 characterized by preparing only in said 2nd pinching plate.

[Claim 11] Adsorption maintenance / adsorption discharge equipment of the sewing-ed object which forms a closing motion implement in said NC sewing machine, and is attached to NC sewing machine according to claim 1 to 10 characterized by being made as [ open / by actuation of the direction of an aperture of this closing motion implement / said 2nd pinching plate ].

[Claim 12] Said closing motion implement is adsorption maintenance / adsorption discharge equipment of the sewing-ed object attached to NC sewing machine according to claim 11 characterized by being an air cylinder.

---

[Translation done.]

**\* NOTICES \***

**JPO and NCIPi are not responsible for any damages caused by the use of this translation.**

1. This document has been translated by computer. So the translation may not reflect the original precisely.

2. \*\*\*\* shows the word which can not be translated.

3. In the drawings, any words are not translated.

---

**DETAILED DESCRIPTION**

---

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to adsorption maintenance / adsorption discharge equipment of the sewing-ed object attached to NC sewing machine equipped with the adsorption holder which holds a sewing-ed object by adsorption of a permanent magnet, and the adsorption discharge equipment of which the adsorbed state can be canceled simply in more detail about adsorption maintenance / adsorption discharge equipment attached to NC sewing machine.

[0002]

[Description of the Prior Art] When various sewing in manufacture processes, such as an air bag, and a bag, shoes, was performed using the NC sewing machine a, for example, as shown in drawing 17, the closing motion type holder c which holds the sewing-ed object b in the pinching condition was provided in the cradle e of the migration equipment d attached to NC sewing machine at the fixed condition.

[0003] Said migration equipment d came to fix the center section of the guide bar j prolonged right and left at the tip of the rod h of oil hydraulic cylinder g which may be expanded and contracted in the cross direction of the table side f of the NC sewing machine a, and this guide bar j was what is made order \*\* F1 according to telescopic motion of said oil hydraulic cylinder g. moreover, it prepared in the posterior part of said cradle e -- it attaches, and Section m is guided at the guide section n of the longitudinal direction of said guide bar j, and movable to a longitudinal direction -- it was made with F2. And the press members p and p were formed in the both sides of said cradle e, and said closing motion type holder c put on Cradle e according to a press operation of these press members p and p was made as immobilization in this cradle e is possible.

[0004] Moreover, said closing motion type holder c was what pinches the sewing-ed object b as cloth which forms the collar of a shirt by Flection q among the pinching plates r and r of two foldable upper and lower sides, as shown in drawing 18. After the closing motion type holder c of this configuration opened said pinching plates r and r on the bench removable and installed near the table of NC sewing machine and set the sewing-ed object b to necessary to said cradle e, it closed this closing motion type holder c, put this on said cradle and was fixed.

[0005] And when the migration equipment d which has said configuration moved by predetermined program control, it was what gives necessary sewing to the sewing-ed object b which the closing motion type holder c fixed to said cradle e could move in the direction of two dimension in the table side f top, and was held with this migration at said closing motion type holder c.

[0006]

[Problem(s) to be Solved by the Invention] (1) However, when using said removable closing motion type holder, it must face attaching a sewing-ed object in necessary to NC sewing machine, and this closing motion type holder must once be removed from a cradle, this must be put on the bench, a sewing-ed object must be set between both [ after and ] pinching plates necessary, after that and this must be moved to said cradle, it must fix, the activity is very troublesome, and time and effort was required. Moreover, there was a problem which requires the activity which removes said closing motion type holder from said cradle after sewing completion, moves this to the bench, opens a closing motion type holder, and removes a sewing object, and that moving takes trouble and time and effort also in this case. Thus, in the former, at every new sewing, it was troublesome, the moving

activity of the closing motion type holder which time amount requires was required, and there was a problem on which sewing working capacity is reduced.

[0007] (2) Moreover, since weight of the closing motion type holder in the condition that the sewing-ed object was set needed to be made light as much as possible from the consideration which mitigates an operator's effort accompanying said moving, a big sewing-ed object has the problem which cannot be set, and the constraint on sewing was accompanied by it.

[0008] (3) Moreover, with NC sewing machine, there was non-economy which needs large sewing workspace from having required the independent special tooth space for the set of the sewing-ed object to a closing motion type holder.

[0009] (4) Furthermore, since the set of the sewing-ed object to a closing motion type holder only fixed the closed closing motion type holder to said cradle through the press member after sandwiching the sewing-ed object between both pinching plates, it had a possibility that the pinched sewing-ed object might carry out a location gap, and the pinching condition might destabilize by resistance at the time of sewing.

[0010] This invention relates to adsorption maintenance / adsorption discharge equipment of the sewing-ed object attached to NC sewing machine with which it is developed in view of this trouble, and it can set quite easily even if it is a big sewing-ed object, and \*\* also enables achievement of space-saving [ on a sewing activity ] on the table of NC sewing machine while being able to perform easily and efficiently set of a sewing-ed object, and removal of a sewing object and being able to expect a productivity drive.

[0011]

[Means for Solving the Problem] In order to solve said technical problem, this invention adopts the following means. That is, the adsorption maintenance / adsorption discharge equipment (henceforth equipment) of the sewing-ed object attached to the NC sewing machine concerning this invention has the adsorption holder which was attached in the migration equipment attached to this NC sewing machine, and was formed in the table side top of NC sewing machine free [ migration ] in the direction of two dimension and which holds a sewing-ed object by adsorption of a permanent magnet, and adsorption discharge equipment of which adsorption of this permanent magnet cancels. And it has the 2nd pinching plate which overlaps on it the 1st pinching plate which can move in this table side top where said adsorption holder is laid in said table side, and in the lap condition, these both pinching plates of both are made by adsorption of the permanent magnet prepared for the one side or its both sides as unification is possible, and it is made as [ pinch / said sewing-ed object / by this adsorption / between both pinching plates ]. To said 2nd pinching plate, in moreover, the condition [ that the protrusion object which can project is established towards said 1st pinching plate, and this adsorption holder is attached in said migration equipment ] By said protrusion object's projecting and pressing said 1st pinching plate, spacing between both pinching plates is expanded by the relief of said 2nd pinching plate, and adsorption of said permanent magnet is canceled. It is characterized by constituting so that the 2nd pinching plate can be opened, where this adsorption is canceled.

[0012] while pivoting said 1st pinching plate and said 2nd pinching plate possible [ closing motion ] by the end face side in said equipment -- this -- it is good to prepare said protrusion object in the both sides of the drawer back part of the 2nd pinching plate.

[0013] In said each equipment, it is good in having fixed the cylinder to said 2nd pinching plate, and having been constituted as a part for the point of the rod, to project and for the body to enable the protrusion of towards said 1st pinching plate by expanding of this cylinder.

[0014] Other modes of the equipment concerning this invention are equipped with the adsorption holder which was attached in the migration equipment attached to this NC sewing machine, and was formed free [ migration ] in the direction of two dimension in the table side top of NC sewing machine and which holds a sewing-ed object by adsorption of a permanent magnet, and the adsorption discharge equipment of which adsorption of this permanent magnet is canceled. And it has the 2nd pinching plate which overlaps on it the 1st pinching plate which can move in this table side top where said adsorption holder is laid in said table side, and both these pinching plates of both lap by adsorption of the permanent magnet prepared for the one side or its both sides, and in the condition, it is made as unification is possible, and it is made as [ pinch / said sewing-ed object / by

this adsorption / between both pinching plates ]. Moreover, when said adsorption holder sets a sewing-ed object between the 1st pinching plate and the 2nd pinching plate, Or while being constituted so that it may move to the necessary location on said table side in case the object by which sewing was carried out is removed, an insertion pore is prepared in the necessary part of said 1st pinching plate. moreover, in the necessary part of the table of said NC sewing machine By said protrusion object's projecting in the condition [ that come to prepare the protrusion object which can project towards said 2nd pinching plate through said insertion pore, and this adsorption holder is attached in said migration equipment ], and having floated said 2nd pinching plate It is characterized by constituting so that the 2nd pinching plate can be opened, where adsorption of said permanent magnet was canceled and this adsorption is canceled.

[0015] while pivoting said 1st pinching plate and said 2nd pinching plate possible [ closing motion ] by the end face side in said equipment -- this -- it is good to prepare said insertion pore in the both sides of the drawer back part of the 1st pinching plate.

[0016] Moreover, in said equipment, it is good in having fixed the cylinder to the table of said NC sewing machine, and having been constituted as a part for the rod point, to project and for the body to make that a protrusion is possible towards said 2nd pinching plate by expanding of this cylinder through said insertion pore.

[0017] Moreover, other modes of the equipment concerning this invention are equipped with the adsorption holder which was attached in the migration equipment attached to this NC sewing machine, and was formed free [ migration ] in the direction of two dimension in the table side top of NC sewing machine and which holds a sewing-ed object by adsorption of a permanent magnet, and the adsorption discharge equipment of which adsorption of this permanent magnet is canceled. And it has the 2nd pinching plate which overlaps on it the 1st pinching plate which can move in this table side top where said adsorption holder is laid in said table side, and both these pinching plates of both lap by adsorption of the permanent magnet prepared for the one side or its both sides, and in the condition, it is made as unification is possible, and it is made as [ pinch / said sewing-ed object / by this adsorption / between both pinching plates ]. Moreover, the interruption protrusion object to which spacing between both pinching plates is made to expand by advancing into the edge joint of both the pinching plate in said unification condition is attached to said NC sewing machine. When this interruption protrusion object interrupts and advances into said joint in the condition [ that said adsorption holder is attached in said migration equipment ], it is characterized by constituting so that the 2nd pinching plate can be opened, where adsorption of said permanent magnet was canceled and this adsorption is canceled.

[0018] So that said double door opening may carry out abbreviation agreement, after it prepared opening for sewing in said 1st pinching plate and the 2nd pinching plate in the state of opposite and both the pinching plate has pinched the sewing-ed object in said each equipment in nothing and the condition of having agreed in this way It is good nothing and to constitute so that a sewing-ed object may be pinched between both pinching plates by this so that the permanent magnet arranged at the inside of the 2nd pinching plate may stick to said 1st pinching plate. So that said double door opening may carry out abbreviation agreement, after it prepared opening for sewing in said 1st pinching plate and the 2nd pinching plate in the state of opposite and both the pinching plate has pinched the sewing-ed object in said each equipment or in nothing and the condition of having agreed in this way It is good nothing and to constitute so that a sewing-ed object may be pinched between both pinching plates by this so that the permanent magnet arranged at the periphery part of said opening of the inside of the 2nd pinching plate may stick to the periphery part of opening of said 1st pinching plate.

[0019] In said each equipment, said permanent magnet is good to prepare only in said 2nd pinching plate.

[0020] Moreover, in said each equipment, it is good to make as [ open / form a closing motion implement in said NC sewing machine, and / by actuation of the direction of an aperture of this closing motion implement / said 2nd pinching plate ]. this closing motion implement -- an air cylinder -- with -- \*\*\*\* -- it is good to constitute.

[0021]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained



based on a drawing.

[Gestalt of the 1st operation] The equipment 1 applied to this invention in drawing 1 -3 is equipped with the adsorption holder 6 of the permanent magnet adsorption method which the table side 3 top of the NC sewing machine 2 was attached by migration equipment 5, and was formed free [ migration ] in the direction of two dimension, and the adsorption discharge equipment 7 of which the adsorption is canceled.

[0022] Said migration equipment 5 comes to fix the center section of the guide bar 11 prolonged right and left at the tip of the rod 10 of the oil hydraulic cylinder 9 which may be expanded and contracted in the cross direction of said table side 3, and can do this guide bar 11 order \*\* F1 according to telescopic motion of this oil hydraulic cylinder 9. And the slide member 12 which can slide on the longitudinal direction is formed in this guide bar 11.

[0023] Very, said adsorption holder 6 can be moved in the direction of two dimension on the table side 3 by the horizontal movement F2 of the slide member 12 in alignment with flexible actuation and said guide bar 11 of said oil hydraulic cylinder 9. Necessary sewing can be given to the sewing-ed object 13 which migration of this direction of two dimension was automatically performed by predetermined program control, and was held by this at said adsorption holder 6. In addition, it is good for position control to adopt an easy pulse motor with a high precision as a driving means of said migration equipment 5.

[0024] The 1st pinching plate 15 rectangle tabular for example, which can move this table side top to necessary in the condition of having been laid in said table side 3 as said adsorption holder 6 is shown in drawing 3 -4, this -- the 2nd pinching plate 16 rectangle tabular for example, which overlaps on the 1st pinching plate 15 -- having -- \*\*\*\* -- this -- the end face section 17 of the 1st pinching plate 15 is being fixed to the lower limit section 19 of said slide member 12. End face side 20 [ and ] of said 2nd pinching plate 16 It is pivoted in end face side 21 (a slide member 12 and the piece 18 of a protrusion which protruded on this are made to intervene in the gestalt of this operation, and constituted) of said 1st pinching plate 15 on a hinge 22, and it is made that closing motion is possible. It is made as [ agree / after both the pinching plates 15 and 16 have overlapped / the circular openings 23, 23, 25, and 25 prepared in the right-and-left side of each pinching plate 15 and 16 ]. Said both pinching plates 15 and 16 consist of a stainless plate.

[0025] Moreover, as shown in drawing 3 and drawing 7 , necessary spacing is set, the piece 26 of support is formed, and the piece 29 of connection prepared in the upper limit of the cylinder 27 for closing motion as an air cylinder etc. is pivoted in the upper limit section of said slide member 12 so that tilting of this cylinder 27 for closing motion may be attained in a vertical plane. Moreover, the connection section 31 prepared at the tip of the rod 30 of each cylinder 27 for closing motion is pivoted in the piece 32 of support which protruded on the top face for a end face flank of said 2nd pinching plate 16, and when each cylinder 27 for closing motion contracts to coincidence, it is constituted so that it may open, as the 2nd pinching plate 16 in the condition of having overlapped the 1st pinching plate 15 shows drawing 4 .

[0026] Moreover, as shown in drawing 4 , while the in-a-circle light-gage filler sheet 35 is stuck on the top face 33 of said 1st pinching plate 15 in the periphery part of said opening 23 As shown in the periphery part of said circular opening 25 drawing 5 -6, while the radii tabular permanent magnet 37 is fixed to the inferior surface of tongue 36 of said 2nd pinching plate 16 in a necessary include-angle pitch, the front face 39 is covered with the same in-a-circle light-gage filler sheet 40 as the above. Therefore, on said 1st pinching plate 15, after said cylinder 27 for closing motion contracted and the 2nd pinching plate 16 has opened, the sewing-ed object 13 as cloth can be carried, as shown in drawing 6 -7. Then, if it changes into the lap condition which said cylinder 27 for closing motion is expanded, and shows both the pinching plate 15 and both 16 in drawing 3 , as shown in drawing 6 , said sewing-ed object (cloth) 13 is pinched by adsorption of said permanent magnet 37 between both the pinching plate 15 and 16, and this sewing-ed object (cloth) 13 can be in the condition of having been held stably at the adsorption holder 6, by it.

[0027] moreover, in the top face of the both sides of the drawer back part of said 2nd pinching plate 16 As shown in drawing 3 -6, the protrusion object 43 which the cylinders 41 and 41 for discharge as an air cylinder etc. are fixed, and was constituted as a part for the point of the rod 42 of this cylinder 41 for discharge by expanding of this cylinder 41 for discharge It is made towards said 1st pinching

plate 15 through the insertion hole 45 prepared in said 2nd pinching plate 16 that a protrusion is possible. And by projecting by coincidence expanding of the cylinders 41 and 41 for discharge on either side, and the bodies' 43 and 43 projecting, and pressing said 1st pinching plate 15, as shown in drawing 9, spacing of said both pinching plates 15 and 16 currently unified in the state of the lap is expanded (the 2nd pinching plate 16 having floated), and it is made as [ cancel / adsorption of said permanent magnet 37 ].

[0028] Said 2nd pinching plate 16 can be made to open in this condition of having been canceled, by making said all cylinders 27 for closing motion reduce to coincidence, as shown in drawing 9.

[0029] An operation of the NC sewing machine 2, the adsorption holder 6, and adsorption discharge equipment 7 grade which have the above configuration is explained below.

[0030] As first shown in drawing 7 and drawing 6, after each cylinders 27 for closing motion contracted all at once and the 2nd pinching plate 16 has opened, the sewing-ed object 13 as cloth is carried on said 1st pinching plate 15 so that said openings 23 and 23 may be covered. If the cylinder 27 for closing motion is expanded and the 2nd pinching plate 16 is closed as shown in drawing 8 after that, said sewing-ed object 13 will be in both the pinching plate 15 and the condition of having been stably pinched among 16, by adsorption of said permanent magnet 37. When said migration equipment 5 is moved to necessary by program control in this condition, said adsorption holder 6 holding the sewing-ed object 13 will move in the direction of two dimension on the table side 3 necessary. As this migration shows to drawing 1, said NC sewing machine 2 takes sewing 28 along the inner circumference edge 44 of said openings 23 and 25 which carried out vertical agreement.

[0031] If coincidence is made to elongate the cylinders 41 and 41 for discharge on either side and each cylinder 27 for closing motion is made to reduce to coincidence after necessary sewing is completed, as shown in drawing 9 expanding of the cylinders 41 and 41 for discharge of these right and left -- following -- said protrusion objects 43 and 43 -- the 1st pinching plate 15 -- turning -- projecting -- this -- the 1st pinching plate 15 -- pressing -- a part for the point 46 of the 2nd pinching plate 16 -- for example, it has floated about 15mm. Adsorption of said permanent magnet 37 will be canceled by expansion of spacing between both the pinching plate 15 and 16. And the 2nd pinching plate 16 is easily opened by contraction of said subsequent cylinder 27 for closing motion.

[0032] In addition, when using said cylinder 27 for closing motion as a contraction \*\* plug, without expanding said cylinder 41 for discharge, since the permanent magnet 37 adsorbs in the periphery part of said opening in both the pinching plates 15 and 16, it becomes very difficult for the 1st pinching plate 15 to also serve as the inclination to come floating to coincidence, and to open the 2nd pinching plate 16. Then, in this invention, after expanding of said cylinder 41 for discharge cancels adsorption of said permanent magnet 37, it carries out to making the cylinder 27 for closing motion reduce, and thereby, aperture actuation of the 2nd pinching plate 16 is made very easy.

[0033] And as shown in drawing 7, where the 2nd pinching plate 16 is opened, the object by which sewing was carried out is removed from the adsorption holder 6, a new sewing-ed object is carried on the 1st pinching plate 15 like the above, and sewing is started at a process like the above.

[0034] [Gestalt of the 2nd operation] Drawing 10 -12 show other modes of the equipment 1 concerning this invention, and said migration equipment 5 and said adsorption holder 6 have the same configuration also in the gestalt of the 1st operation.

[0035] In the gestalt of this operation, in case the adsorption holder 6 sets the sewing-ed object as cloth etc. between the 1st pinching plate 15 and the 2nd pinching plate 16, or in case it removes the object by which sewing was carried out, it moves to the corner part 47 shown in the necessary location on said table side 3, for example, drawing 10. And the insertion pores 49 and 49 are formed, and as shown in drawing 12, alignment is carried out to said insertion pores 49 and 49, and the cylinders 41 and 41 for discharge are formed in the both sides of the drawer back part of said 1st pinching plate 15 at the table 50 of said NC sewing machine 2. Moreover, by [ in which this protrusion object 51 projects through said insertion pore 49, and has floated said 2nd pinching plate 16 ] having been constituted as a part for the point of the rod 48 of this cylinder 41 for discharge, it is made as [ project / through said insertion pore 49 / the body 51 / project and / upward ], and as shown in drawing 13, it is made as [ cancel / adsorption of a permanent magnet 37 ].

[0036] After necessary sewing is completed, when it makes coincidence elongate the cylinder 41 for discharge on either side and each cylinder 27 for closing motion is made to reduce to coincidence, as

mentioned above, adsorption of said permanent magnet 37 will be canceled by the protrusion of the protrusion objects 51 and 51, and as shown in drawing 14 , the 2nd pinching plate 16 will be easily opened by contraction of the cylinder 27 for closing motion which can be set after that.

[0037] [Gestalt of the 3rd operation] Drawing 15 -16 show the mode of others of the adsorption discharge equipment 7 concerning this invention, and migration equipment 5 and the adsorption holder 6 are similarly constituted in the gestalt of the 1st operation.

[0038] And the interruption protrusion object 53 which makes a wedge shape is attached to said NC sewing machine 2 at the joint 52 of the edge of both the pinching plates 15 and 16 in said unification condition so that spacing between both the pinching plate 15 and 16 may be made to expand and penetration may become possible. This interruption protrusion object 53 is formed in the shape of [ from which a tip serves as a taper ] a cross-section triangle, and when this interrupts said joint 52 by expanding of a cylinder and advances to it, it is constituted so that adsorption of said permanent magnet 37 may be canceled.

[0039] And in this adsorption discharge condition, the 2nd pinching plate 16 can be easily opened by making the cylinder 27 for closing motion reduce like the above.

[0040] [The gestalt of other operations]

(1) If the adsorption holder which constitutes this invention is constituted possible [ pinching of a sewing-ed object ] between the 1st pinching plate and the 2nd pinching plate, both pinching plates of both lap by adsorption of a permanent magnet and it can unify in the condition, this permanent magnet may be prepared for both sides besides in the case of preparing only in one side of a pinching plate. Moreover, as long as the permanent magnet laps by adsorption and can unify both the pinching plate besides preparing in the periphery part of opening as mentioned above in the condition, the arrangement condition of a permanent magnet can be set as arbitration. However, to prepare a permanent magnet in the 1st pinching plate 15 which can move in a table side top, it is necessary to consider so that the motion on the table side of an adsorption holder may not be worsened by adsorption of this permanent magnet.

[0041] (2) Although the gestalt of said operation showed the migration equipment for attaching an adsorption holder, various kinds of configurations for which an others and this adsorption holder may be moved in the direction of two dimension on a table side can be used for it.

[0042] (3) If the 1st pinching plate and the 2nd pinching plate lap by adsorption of the permanent magnet prepared for the one side or its both sides and it may be unified in the condition, the quality of the material of this pinching plate is not restricted to the above stainless plates, and various kinds of magnetic plates can be used for it.

[0043] (4) A means to make the protrusion object of which adsorption of said permanent magnet is canceled project may be a means using an electromagnet besides [ which uses cylinders, such as an air cylinder, ] a means etc. Moreover, although arranging on both sides of a pinching plate can perform adsorption discharge with sufficient balance and this protrusion object has it, as long as adsorption discharge can be performed, it can be positioned to various kinds, such as what is performed in the central part of a pinching plate. [ desirable ]

[0044] (5) Although it is desirable to connect possible [ closing motion of both the end face sides ] as in the gestalt of said operation, the 1st pinching plate holding a sewing-ed object and the 2nd pinching plate can also be constituted so that it may estrange, while the 1st pinching plate had maintained the parallel condition to the 2nd pinching plate. Although a means to open the pinching plate of \*\*\*\* 2 is performed using said cylinder for closing motion, the means pulled up using others, a wire, or link motion and the means opened further manually can also be used for it.

[0045] (6) When preparing the insertion pore which makes the protrusion object which projects upward insert in the 1st pinching plate, this insertion pore may be formed as an insertion pore of the letter of a notch besides forming as a closed hole.

[0046] (7) As the gestalt of said operation shows, when preparing opening in both the pinching plates 15 and 16, this opening can be constituted in various kinds according to a request sewing gestalt besides the above mentioned thing formed circularly. Moreover, it can also constitute as what does not have this opening.

[0047]

[Effect of the Invention] This invention does so the outstanding effectiveness like a less or equal.

(1) When based on the equipment concerning this invention, while being able to hold a sewing-ed object simply between the 1st and 2nd pinching plate by adsorption of a permanent magnet, necessary sewing can be stably performed, where a sewing-ed object is held certainly.

[0048] (2) Moreover, expansion of spacing between both the pinching plates in accordance with the protrusion of said protrusion object and the 2nd pinching plate have floated, or penetration of the interruption protrusion object to the joint of the edge of both the pinching plate can cancel the adsorbed state of a permanent magnet easily, and these can open the 2nd pinching plate quite easily. a condition [ that an adsorption holder is attached in the migration equipment of NC sewing machine when based on this invention from this thing ] -- (-- removing an adsorption holder from migration equipment -- \*\*\*\*\* (ing) --) -- the set of the sewing-ed object to an adsorption holder and the activity which removes the object by which sewing was carried out from an adsorption holder can be done without a failure, even if a sewing-ed object is big. When conventionally based on a means, the activity which is troublesome and time and effort requires that the holder of a sewing-ed object had to be moved was required between the table of NC sewing machine, and the bench as mentioned above, but such a problem can be solved when based on this invention. Moreover, although there was a problem which cannot set a holder as a big thing (there is weight) in consideration of an operator's effort burden in the former, therefore sewing-ed objects, such as big cloth, had the problem which is hard to set When based on this invention, it can set without applying a burden to an operator, even if it is sewing-ed objects, such as big cloth, and enables accessories to an important figure to give necessary sewing to various kinds of sewing-ed objects. Above, in short, when based on this invention, while being able to reduce activity time and effort and efforts and being able to raise sewing working capacity, reduction of sewing cost can be expected.

[0049] (3) moreover, a condition [ that an adsorption holder is attached in the migration equipment of NC sewing machine when based on this invention ] -- (-- removing an adsorption holder from migration equipment -- \*\*\*\*\* (ing) --) -- since the set of the sewing-ed object to an adsorption holder and the activity which removes the object by which sewing was carried out from an adsorption holder can be done, the independent bench like before is not needed but it can plan space-saving [ on a sewing activity ].

[0050] (4) In this invention, in order to perform adsorption of both the pinching plate not using an electromagnet but using a permanent magnet, since it is lightweight compared with an electromagnet, it not only can constitute an adsorption means cheaply, but a permanent magnet has the advantage by which a burden is not placed on the migration equipment to which an adsorption holder is moved on a table side.

[0051] (5) While pivoting the 1st pinching plate and the 2nd pinching plate possible [ closing motion ] by the end face side When the configuration which establishes the protrusion object which adopts the configuration which is located in the both sides of the drawer back part of the 2nd pinching plate, projects, and establishes the body, or projects upward in the both sides of the drawer back part of the 1st pinching plate is adopted, there is an advantage which can attain adsorption discharge of a permanent magnet with sufficient balance easily.

[0052] (6) When preparing the permanent magnet to which the 1st pinching plate and the 2nd pinching plate are made to stick only in the 2nd pinching plate which overlaps on it instead of the 1st pinching plate directly laid on a table side, adsorption power of the permanent magnet to a table side can be made small as much as possible, and a motion in the direction of two dimension of the adsorption holder on a table side can be attained more smoothly by this.

---

[Translation done.]

## \* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

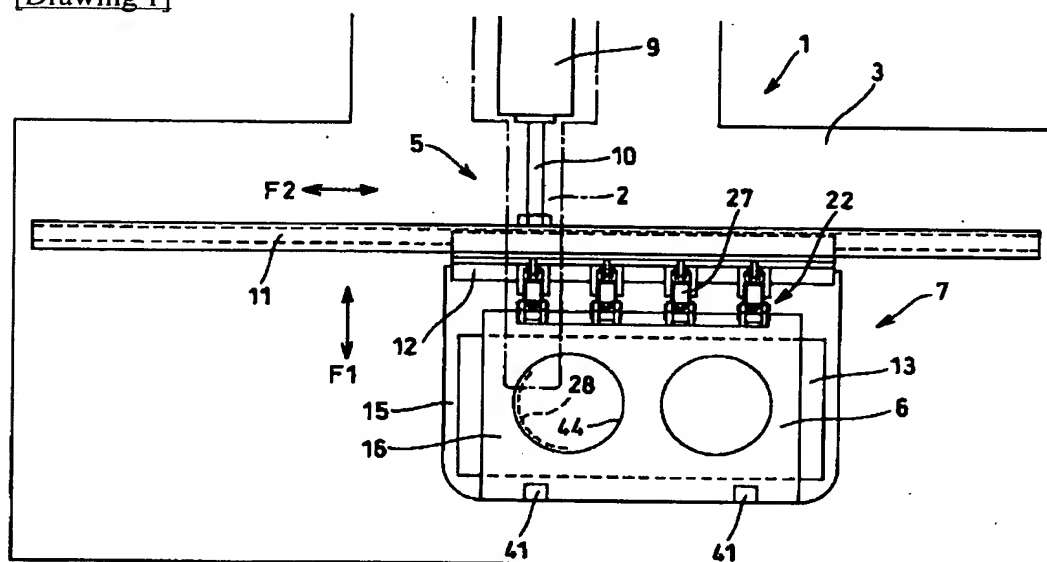
1. This document has been translated by computer. So the translation may not reflect the original precisely.

2. \*\*\*\* shows the word which can not be translated.

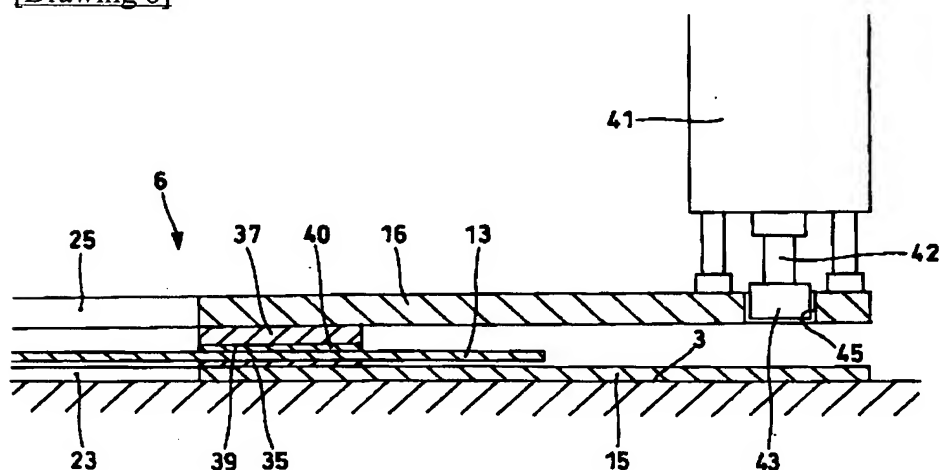
3. In the drawings, any words are not translated.

## DRAWINGS

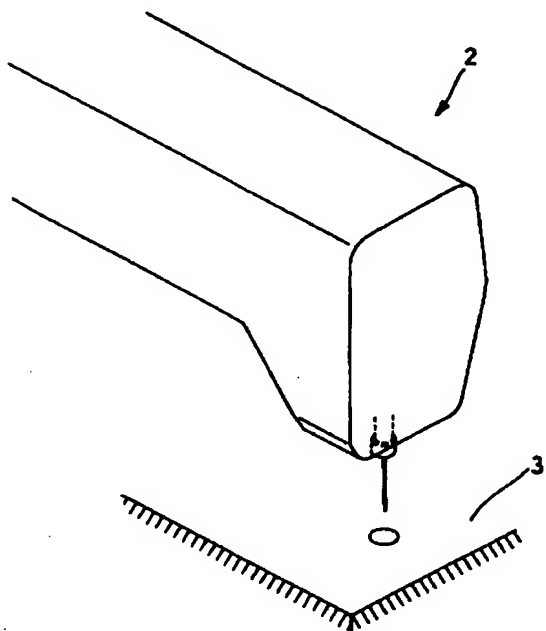
[Drawing 1]



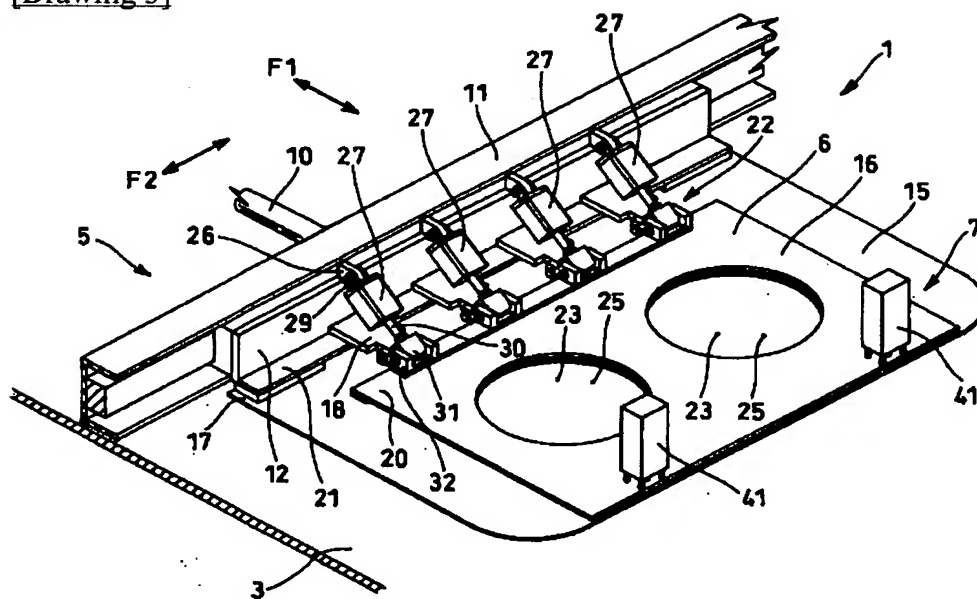
[Drawing 6]



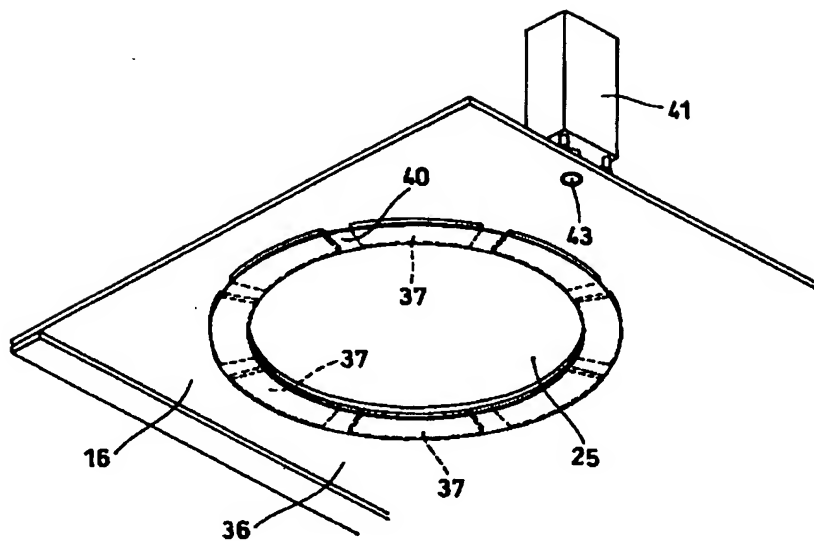
[Drawing 2]



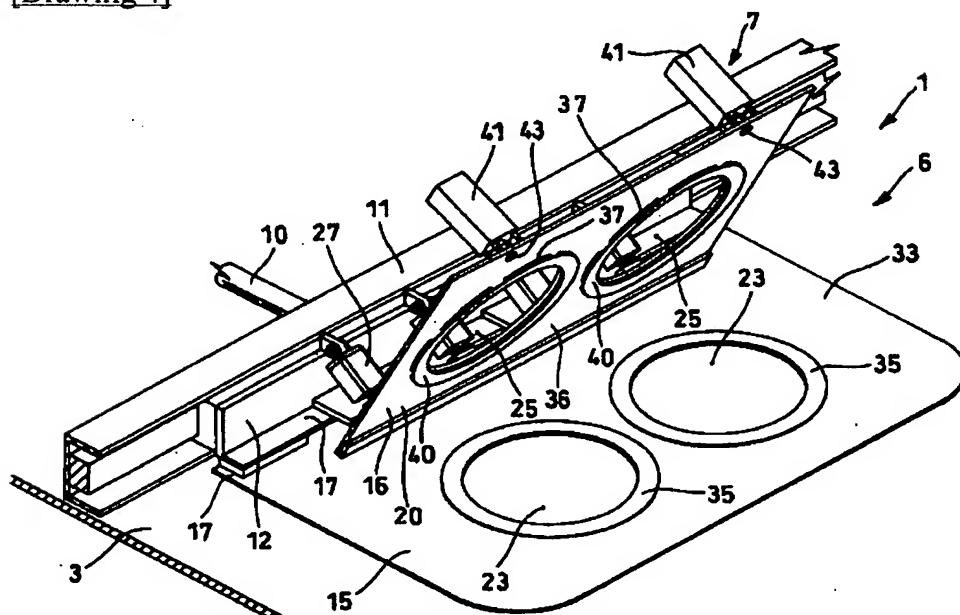
[Drawing 3]



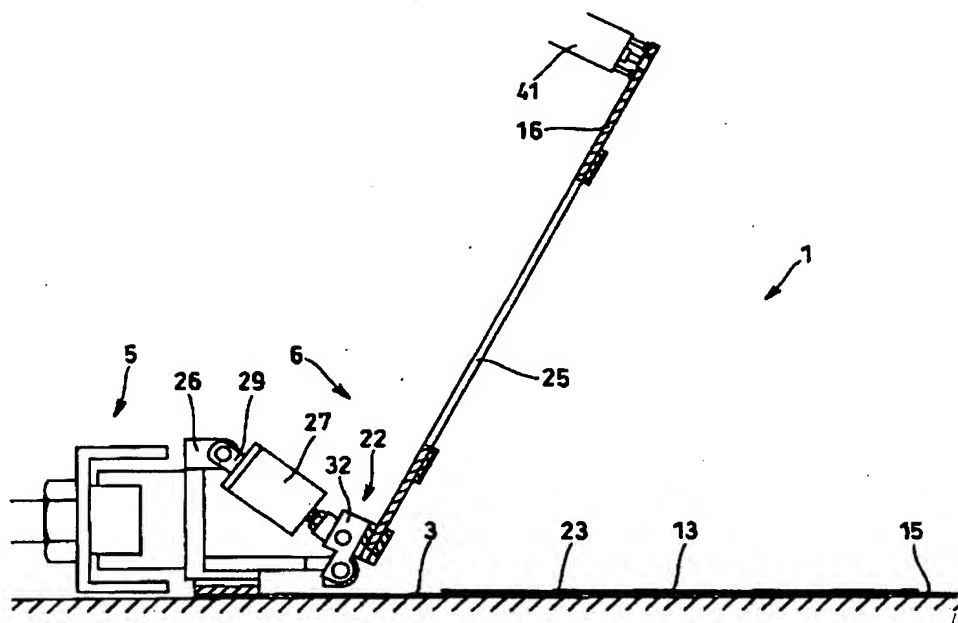
[Drawing 5]



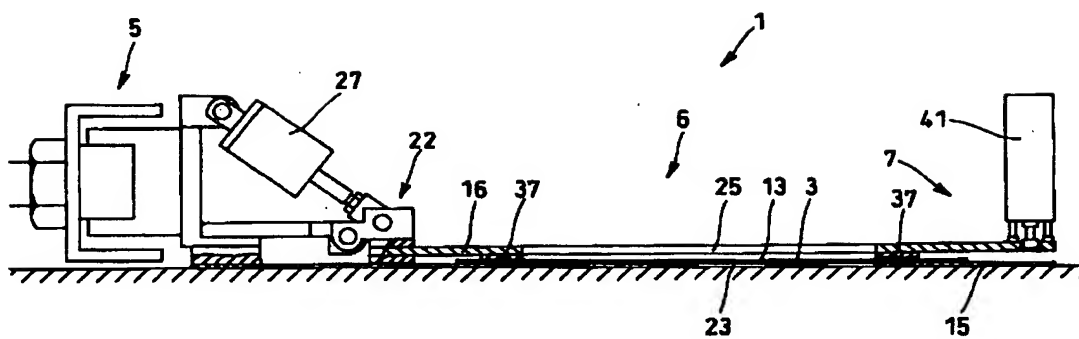
[Drawing 4]



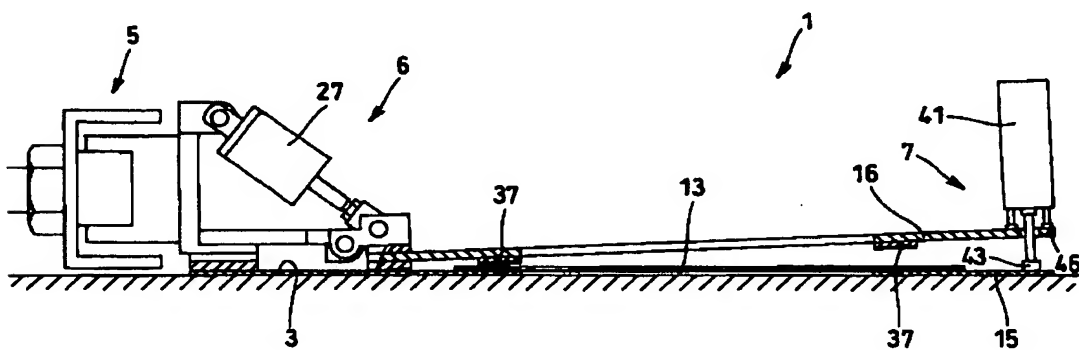
[Drawing 7]



[Drawing 8]

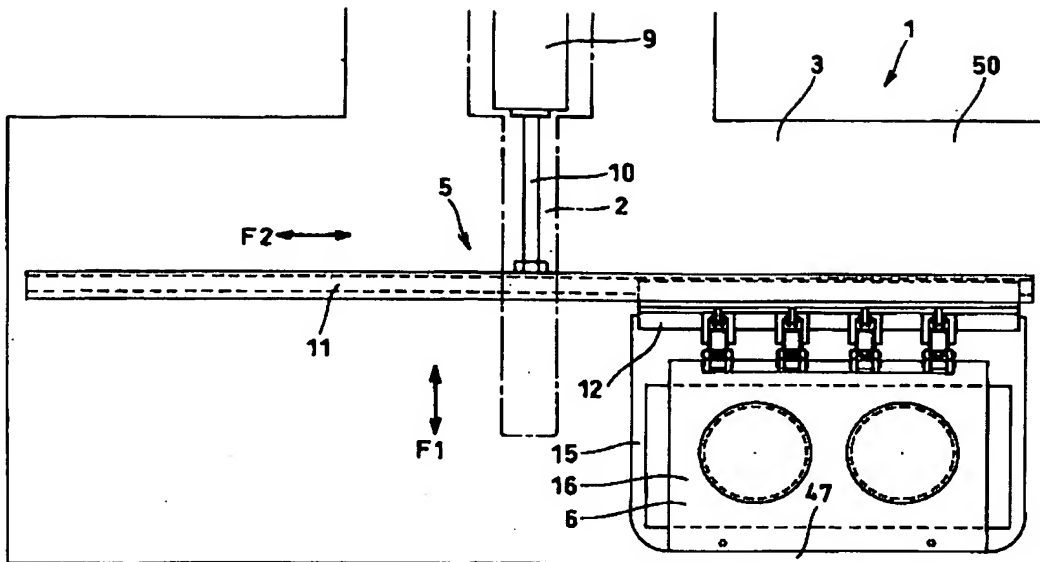


[Drawing 9]

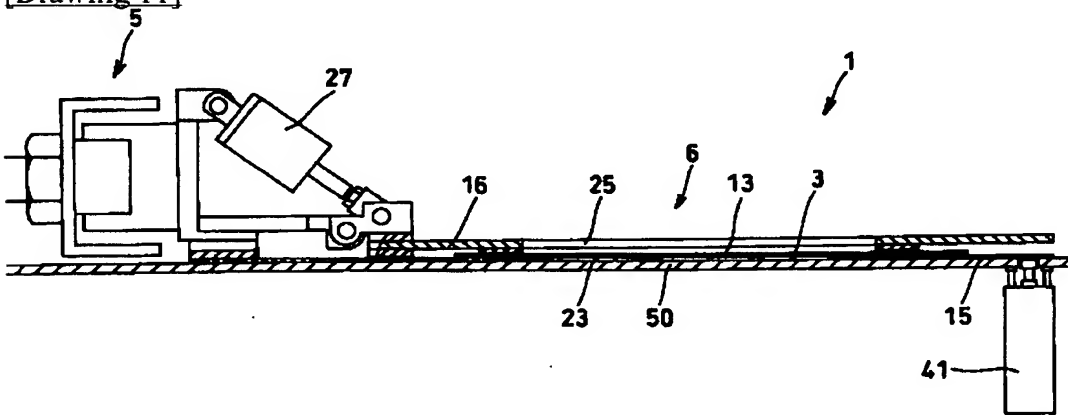


[Drawing 10]

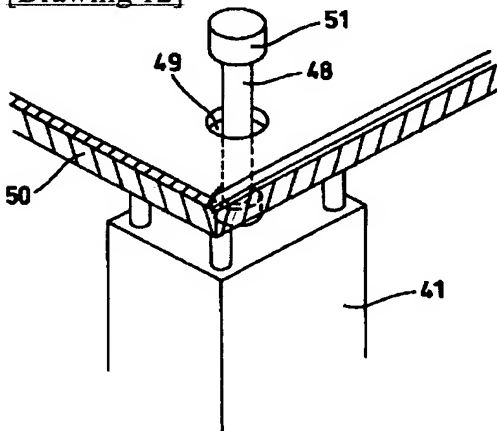




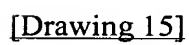
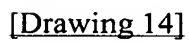
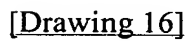
[Drawing 11]

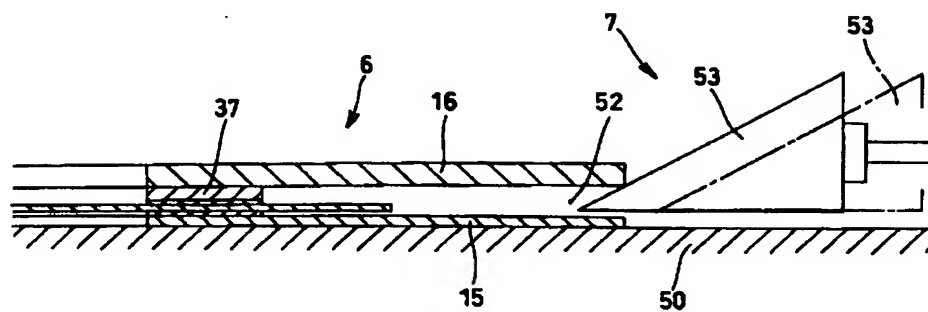


[Drawing 12]

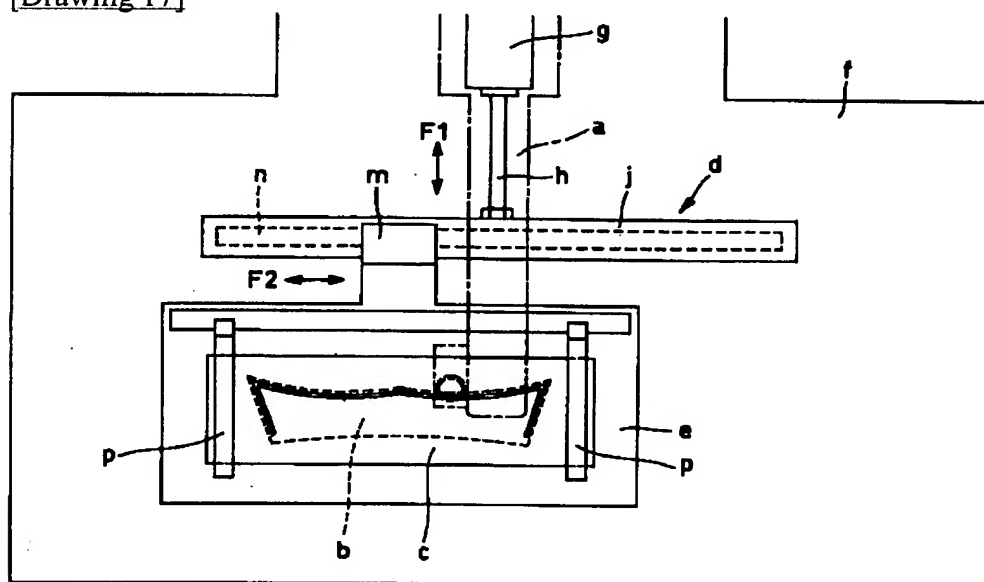


[Drawing 13]

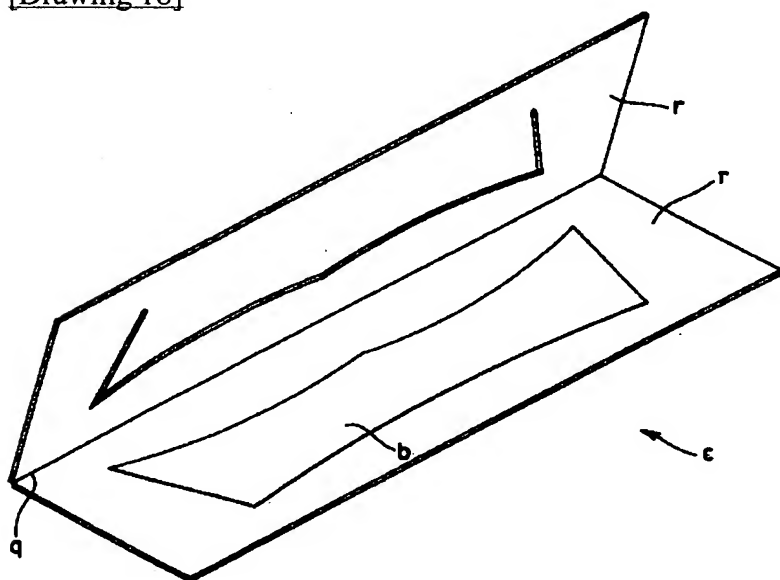




[Drawing 17]



[Drawing 18]



[Translation done.]

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-078996

(43)Date of publication of application : 19.03.2002

(51)Int.Cl.

D05B 39/00  
B60R 21/16

(21)Application number : 2000-271340

(71)Applicant : MATSUYA R & D:KK

(22)Date of filing : 07.09.2000

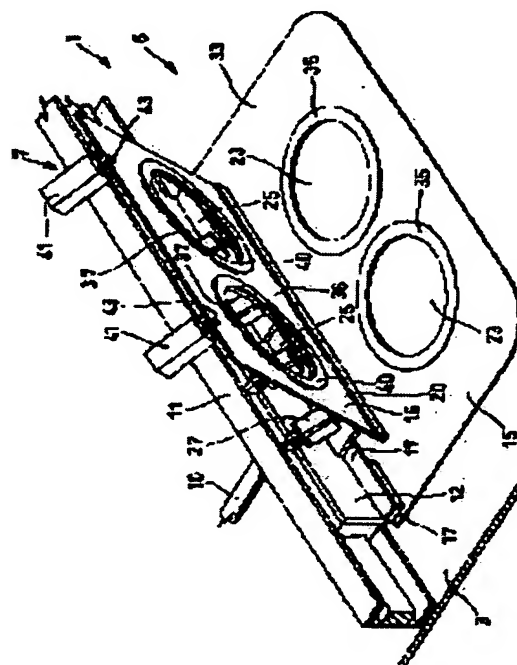
(72)Inventor : GOTO HIDETAKA  
SAKO TATSUO  
HASEGAWA KATSUTO

## (54) DEVICE FOR ATTRACTION HOLDING AND RELEASING OF MATERIAL TO BE SEWN PROVIDED TO NC SEWING MACHINE

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To improve sewing operation efficiency and to reduce sewing costs by reducing the time of sewing operations with an NC sewing machine.

**SOLUTION:** The NC sewing machine is provided with an attraction holder 6 which can flexibly move in two-dimensional directions on its table surface 3. The attraction holder 6 is composed of a first holding plate 15 which can open and close and a second holding plate 16 which is overlapped and connected onto it in such a way that they can open and close. A material to be sewn is held between the closed holding plates 15 and 16 by the attraction of permanent magnets 37. Also, the NC sewing machine is provided with an attraction releasing device 7 which releases the attraction of the permanent magnets 37. The attraction releasing device 7 has releasing cylinders 41 on both sides of the extremity end of the second holding plate 16 and the space between the holding plates 15 and 16 is increased by protruding the extremity of their rods, and as a result, the attraction of the permanent magnets 37 is released.



## LEGAL STATUS

[Date of request for examination] 27.09.2001

[Date of sending the examiner's decision of rejection] 30.11.2004

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号  
特開2002-78996  
(P2002-78996A)

(43) 公開日 平成14年3月19日 (2002.3.19)

(51) Int.Cl.<sup>7</sup>

識別記号

F I

テ-マ-コード (参考)

D 0 5 B 39/00

D 0 5 B 39/00

3 B 1 5 0

B 6 0 R 21/16

B 6 0 R 21/16

3 D 0 5 4

審査請求 有 請求項の数12 O L (全 14 頁)

(21) 出願番号 特願2000-271340 (P2000-271340)

(22) 出願日 平成12年9月7日 (2000.9.7)

(71) 出願人 595105009

株式会社松屋アールアンドディ

福井県大野市元町3番19号

(72) 発明者 後藤 秀隆

福井県大野市元町3番19号 株式会社松屋  
アールアンドディ内

(72) 発明者 佐子 辰男

福井県大野市元町3番19号 株式会社松屋  
アールアンドディ内

(74) 代理人 100085246

弁理士 岡本 清一郎

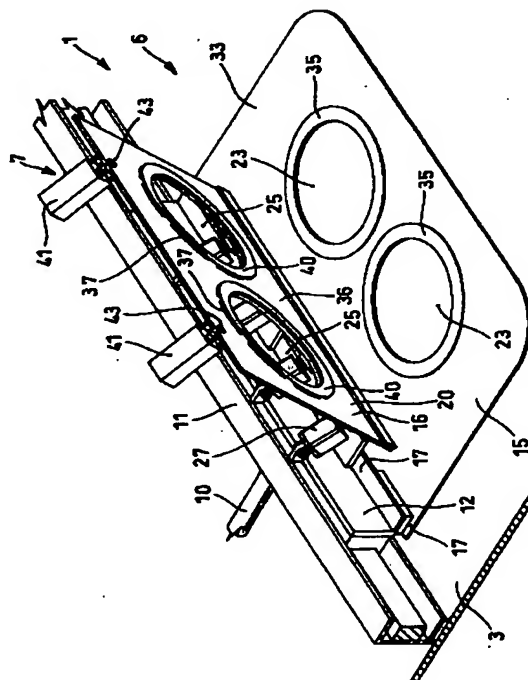
最終頁に続く

(54) 【発明の名称】 NCマシンに付設される、被縫製物の吸着保持・吸着解除装置

(57) 【要約】

【課題】 NCマシンによる縫製作業手間を減じて縫製作業能率の向上と縫製コストの低減を図る。

【解決手段】 NCマシンに、そのテーブル面3上を二次元方向で移動自在となるように吸着保持具6を設ける。吸着保持具6は、開閉可能な第1の挟持板15とその上に重なる第2の挟持板16とを開閉可能に連結して構成されており、永久磁石37の吸着によって、閉じた挟持板15、16間で被縫製物を保持する。又NCマシンは、永久磁石37の吸着を解除する吸着解除装置7を具える。吸着解除装置7は、第2の挟持板16の先側部分の両側に解除用シリンダ41、41を設け、そのロッド先端が下方に突出することにより、両挟持板15、16間の間隔が拡大されて永久磁石37の吸着が解除される。



## 【特許請求の範囲】

【請求項 1】 NC ミシンのテーブル面上を、該 NC ミシンに付設された移動装置に取着されて二次元方向で移動自在に設けられた、永久磁石の吸着により被縫製物を保持する吸着保持具と、該永久磁石の吸着を解除する吸着解除装置とを具えており、

前記吸着保持具は、前記テーブル面に載置された状態で該テーブル面上を移動できる第 1 の挟持板とその上に重なり合う第 2 の挟持板とを有し、該両挟持板相互は、その一方又はその双方に設けた永久磁石の吸着により、重なり状態で一体化可能となされ、該吸着によって前記被縫製物が両挟持板間で挟持される如くなされてお

り、

又前記第 2 の挟持板には、前記第 1 の挟持板に向けて突出可能な突出体が設けられ、該吸着保持具が前記移動装置に取着されたままの状態、前記突出体が突出して前記第 1 の挟持板を押圧することにより、両挟持板間の間隔が前記第 2 の挟持板の浮き上がりにより拡大されて前記永久磁石の吸着が解除され、該吸着が解除された状態で第 2 の挟持板を開くことができるように構成したことを特徴とする NC ミシンに付設される、被縫製物の吸着保持・吸着解除装置。

【請求項 2】 前記第 1 の挟持板と前記第 2 の挟持板とをその基端側で開閉可能に枢着すると共に、該第 2 の挟持板の先側部分の両側に前記突出体を設けたことを特徴とする請求項 1 記載の NC ミシンに付設される、被縫製物の吸着保持・吸着解除装置。

【請求項 3】 前記第 2 の挟持板にシリンダが固設され、そのロッドの先端部分として構成された突出体が、該シリンダの伸長によって、前記第 1 の挟持板に向けて突出可能となされていることを特徴とする請求項 1 又は 2 記載の NC ミシンに付設される、被縫製物の吸着保持・吸着解除装置。

【請求項 4】 NC ミシンのテーブル面上を、該 NC ミシンに付設された移動装置に取着されて二次元方向で移動自在に設けられた、永久磁石の吸着により被縫製物を保持する吸着保持具と、該永久磁石の吸着を解除する吸着解除装置とを具えており、

前記吸着保持具は、前記テーブル面に載置された状態で該テーブル面上を移動できる第 1 の挟持板とその上に重なり合う第 2 の挟持板とを有し、該両挟持板相互は、その一方又はその双方に設けた永久磁石の吸着により重なり状態で一体化可能となされ、該吸着によって前記被縫製物が両挟持板間で挟持される如くなされてお

り、

又前記吸着保持具は、第 1 の挟持板と第 2 の挟持板との間に被縫製物をセットする際、或いは縫製された物を取り外す際に、前記テーブル面上の所要位置に移動するように構成されると共に前記第 1 の挟持板の所要部分には挿通孔部が設けられ、又前記 NC ミシンのテーブルの所要部位には、前記挿通孔部を通して前記第 2 の挟持板に向けて突出可能な突出体を設けてなり、該吸着保持具が

前記移動装置に取着されたままの状態の前記突出体が突出して前記第 2 の挟持板を浮き上げることにより、前記永久磁石の吸着が解除され、該吸着が解除された状態で第 2 の挟持板を開くことができるように構成したことを特徴とする NC ミシンに付設される、被縫製物の吸着保持・吸着解除装置。

【請求項 5】 前記第 1 の挟持板と前記第 2 の挟持板とをその基端側で開閉可能に枢着すると共に、該第 1 の挟持板の先側部分の両側に前記挿通孔部を設けたことを特徴とする請求項 4 記載の NC ミシンに付設される、被縫製物の吸着保持・吸着解除装置。

【請求項 6】 前記 NC ミシンのテーブルにシリンダが固設され、そのロッドの先端部分として構成された突出体が、該シリンダの伸長によって、前記挿通孔部を通して前記第 2 の挟持板に向けて突出可能となされていることを特徴とする請求項 5 記載の NC ミシンに付設される、被縫製物の吸着保持・吸着解除装置。

【請求項 7】 NC ミシンのテーブル面上を、該 NC ミシンに付設された移動装置に取着されて二次元方向で移動自在に設けられた、永久磁石の吸着により被縫製物を保持する吸着保持具と、該永久磁石の吸着を解除する吸着解除装置とを具えており、

前記吸着保持具は、前記テーブル面に載置された状態で該テーブル面上を移動できる第 1 の挟持板とその上に重なり合う第 2 の挟持板とを有し、該両挟持板相互は、その一方又はその双方に設けた永久磁石の吸着により重なり状態で一体化可能となされ、該吸着によって前記被縫製物が両挟持板間で挟持される如くなされてお

り、

又、前記一体化状態にある両挟持板の端縁合わせ目に進入することによって両挟持板間の間隔を拡大させる割り込み突出体が前記 NC ミシンに付設され、前記吸着保持具が前記移動装置に取着されたままの状態であ

る該割り込み突出体が前記合わせ目に割り込み進入することによって前記永久磁石の吸着が解除され、該吸着が解除された状態で第 2 の挟持板を開くことができるように構成したことを特徴とする NC ミシンに付設される、被縫製物の吸着保持・吸着解除装置。

【請求項 8】 前記第 1 の挟持板と第 2 の挟持板には縫製用の開口が対向状態で設けられ、両挟持板が被縫製物を挟持した状態で前記両開口が略合致するように構成されており、又このように合致した状態で、第 2 の挟持板の内面に配置された永久磁石が前記第 1 の挟持板に吸着するようになされ、これにより両挟持板間で被縫製物が挟持されるように構成されていることを特徴とする請求項 1 ～ 7 のいずれかに記載の NC ミシンに付設される、被縫製物の吸着保持・吸着解除装置。

【請求項 9】 前記第 1 の挟持板と第 2 の挟持板には縫製用の開口が対向状態で設けられ、両挟持板が被縫製物を挟持した状態で前記両開口が略合致するように構成されており、又このように合致した状態で、第 2 の挟持板

の内面の前記開口の周縁部分に配置された永久磁石が前記第1の挟持板の開口の周縁部分に吸着するようになされ、これにより両挟持板間で被縫製物が挟持されるように構成されていることを特徴とする請求項1～7のいずれかに記載のNCマシンに付設される、被縫製物の吸着保持・吸着解除装置。

【請求項10】 前記永久磁石は前記第2の挟持板にのみ設けたことを特徴とする請求項1～9のいずれかに記載のNCマシンに付設される、被縫製物の吸着保持・吸着解除装置。

【請求項11】 前記NCマシンに開閉具を設け、該開閉具の開き方向の動作により前記第2の挟持板が開くようになされていることを特徴とする請求項1～10のいずれかに記載のNCマシンに付設される、被縫製物の吸着保持・吸着解除装置。

【請求項12】 前記開閉具はエアシリンダであることを特徴とする請求項11記載のNCマシンに付設される、被縫製物の吸着保持・吸着解除装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、NCマシンに付設される吸着保持・吸着解除装置に関するものであり、より詳しくは、被縫製物を永久磁石の吸着により保持する吸着保持具と、その吸着状態を簡易に解除することのできる吸着解除装置とを具える、NCマシンに付設される、被縫製物の吸着保持・吸着解除装置に関するものである。

【0002】

【従来の技術】エアバッグや靴、シューズ等の製造過程における各種縫製をNCマシンaを用いて行なう場合、例えば図17に示すように、被縫製物bを挟持状態に保持する開閉式保持具cを、NCマシンに付設された移動装置dの受台eに固定状態に設けていた。

【0003】前記移動装置dは、NCマシンaのテーブル面fの前後方向に伸縮し得る油圧シリンダgのロッドhの先端に、左右に延びるガイドバーjの中央部を固定してなり、前記油圧シリンダgの伸縮に応じて該ガイドバーjが前後進F1できるものであった。又前記受台eの後部に設けた取付け部mが、前記ガイドバーjの左右方向のガイド部nに案内されて、左右方向に移動可能F2となされていた。そして、前記受台eの両側には押圧部材p、pが設けられ、該押圧部材p、pの押圧作用によって、受台eに載せられた前記開閉式保持具cを該受台eに固定可能となされていた。

【0004】又前記開閉式保持具cは、図18に示すように、屈曲部qで折畳み可能の上下2枚の挟持板r、r間で、例えばワイシャツの襟を形成する布地等としての被縫製物bを挟持するものであった。かかる構成の開閉式保持具cは、前記受台eに対して着脱可能のものであり、NCマシンのテーブル近傍に設置された作業台上

で、前記挟持板r、rを開いて被縫製物bを所要にセットした後に該開閉式保持具cを閉じ、これを前記受台に載せて固定していた。

【0005】そして、前記構成を有する移動装置dが所定のプログラム制御によって移動することにより、前記受台eに固定された開閉式保持具cがテーブル面f上を二次元方向で移動でき、この移動に伴い、前記開閉式保持具cに保持された被縫製物bに所要の縫製を施すものであった。

10 【0006】

【発明が解決しようとする課題】(1) しかしながら、着脱可能な前記開閉式保持具を用いるときは、NCマシンに対して被縫製物を所要に取り付けるに際し、該開閉式保持具を受台から一旦取り外してこれを作業台上に載せて後、両挟持板間に被縫製物を所要にセットし、その後、これを前記受台に移して固定しなければならず、その作業が非常に面倒であり手間を要した。又縫製完了後においても、前記開閉式保持具を前記受台から取り外してこれを作業台上に移し、開閉式保持具を開いて縫製物を取り外す作業を要し、この場合もその移し替えに面倒さと手間を要する問題があった。このように従来においては、新たな縫製の都度、面倒で時間の掛かる開閉式保持具の移し替え作業を要したのであり、縫製作業能率を低下させる問題があったのである。

20

【0007】(2) 又前記移し替えに伴う作業者の労力を軽減する配慮から、被縫製物がセットされた状態の開閉式保持具の重量を極力軽くする必要があったため、大きな被縫製物はセットできない問題があり、縫製上の制約が伴った。

30 【0008】(3) 又、開閉式保持具に対する被縫製物のセットのために、NCマシンとは独立した特別なスペースを要したことから、広い縫製作業スペースを必要とする不経済があった。

【0009】(4) 更に、開閉式保持具に対する被縫製物のセットは、両挟持板間で被縫製物を挟んだ後、閉じた開閉式保持具を押圧部材を介して前記受台に固定するだけであったため、縫製時の抵抗によって、挟持された被縫製物が位置ずれしてその挟持状態が不安定化する恐れがあった。

40

【0010】本発明は、かかる問題点に鑑みて開発されたものであり、NCマシンのテーブル上で、被縫製物のセット及び縫製物の取り外しを容易且つ能率的に行なうことができ生産性向上を期し得ると共に、大きな被縫製物であっても難無くセットでき、然も、縫製作業上の省スペースを達成可能とする、NCマシンに付設される、被縫製物の吸着保持・吸着解除装置に関するものである。

【0011】

【課題を解決するための手段】前記課題を解決するため、本発明は以下の手段を採用する。即ち本発明に係る

NCマシンに付設される、被縫製物の吸着保持・吸着解除装置（以下装置という）は、NCマシンのテーブル面上を、該NCマシンに付設された移動装置に取着されて二次元方向で移動自在に設けられた、永久磁石の吸着により被縫製物を保持する吸着保持具と、該永久磁石の吸着を解除する吸着解除装置とを具えている。そして前記吸着保持具は、前記テーブル面に載置された状態で該テーブル面上を移動できる第1の挟持板とその上に重なり合う第2の挟持板とを有し、該両挟持板相互は、その一方又はその双方に設けた永久磁石の吸着により、重なり状態で一体化可能となされ、該吸着によって前記被縫製物が両挟持板間で挟持される如くなされている。又前記第2の挟持板には、前記第1の挟持板に向けて突出可能な突出体が設けられ、該吸着保持具が前記移動装置に取着されたままの状態、前記突出体が突出して前記第1の挟持板を押圧することにより、両挟持板間の間隔が前記第2の挟持板の浮き上がりにより拡大されて前記永久磁石の吸着が解除され、該吸着が解除された状態で第2の挟持板を開くことができるように構成したことを特徴とするものである。

【0012】前記装置において、前記第1の挟持板と前記第2の挟持板とをその基端側で開閉可能に枢着すると共に、該第2の挟持板の先側部分の両側に前記突出体を設けるのがよい。

【0013】前記各装置において、前記第2の挟持板にシリンダを固設し、そのロッドの先端部分として構成された突出体が、該シリンダの伸長によって、前記第1の挟持板に向けて突出可能とするのがよい。

【0014】本発明に係る装置の他の態様は、NCマシンのテーブル面上を、該NCマシンに付設された移動装置に取着されて二次元方向で移動自在に設けられた、永久磁石の吸着により被縫製物を保持する吸着保持具と、該永久磁石の吸着を解除する吸着解除装置とを具えている。そして前記吸着保持具は、前記テーブル面に載置された状態で該テーブル面上を移動できる第1の挟持板とその上に重なり合う第2の挟持板とを有し、該両挟持板相互は、その一方又はその双方に設けた永久磁石の吸着により重なり状態で一体化可能となされ、該吸着によって前記被縫製物が両挟持板間で挟持される如くなされている。又前記吸着保持具は、第1の挟持板と第2の挟持板との間に被縫製物をセットする際、或いは縫製された物を取り外す際に、前記テーブル面上の所要位置に移動するように構成されると共に前記第1の挟持板の所要部分には挿通孔部が設けられ、又前記NCマシンのテーブルの所要部位には、前記挿通孔部を通して前記第2の挟持板に向けて突出可能な突出体を設けてなり、該吸着保持具が前記移動装置に取着されたままの状態で前記突出体が突出して前記第2の挟持板を浮き上げることににより、前記永久磁石の吸着が解除され、該吸着が解除された状態で第2の挟持板を開くことができるように構成し

たことを特徴とするものである。

【0015】前記装置において、前記第1の挟持板と前記第2の挟持板とをその基端側で開閉可能に枢着すると共に、該第1の挟持板の先側部分の両側に前記挿通孔部を設けるのがよい。

【0016】又前記装置において、前記NCマシンのテーブルにシリンダを固設し、そのロッド先端部分として構成された突出体が、該シリンダの伸長によって、前記挿通孔部を通して前記第2の挟持板に向けて突出可能となすのがよい。

【0017】又本発明に係る装置の他の態様は、NCマシンのテーブル面上を、該NCマシンに付設された移動装置に取着されて二次元方向で移動自在に設けられた、永久磁石の吸着により被縫製物を保持する吸着保持具と、該永久磁石の吸着を解除する吸着解除装置とを具えている。そして前記吸着保持具は、前記テーブル面に載置された状態で該テーブル面上を移動できる第1の挟持板とその上に重なり合う第2の挟持板とを有し、該両挟持板相互は、その一方又はその双方に設けた永久磁石の吸着により重なり状態で一体化可能となされ、該吸着によって前記被縫製物が両挟持板間で挟持される如くなされている。又、前記一体化状態にある両挟持板の端縁合わせ目に進入することによって両挟持板間の間隔を拡大させる割り込み突出体が前記NCマシンに付設され、前記吸着保持具が前記移動装置に取着されたままの状態、該割り込み突出体が前記合わせ目に割り込み進入することによって前記永久磁石の吸着が解除され、該吸着が解除された状態で第2の挟持板を開くことができるように構成したことを特徴とするものである。

【0018】前記各装置において、前記第1の挟持板と第2の挟持板に縫製用の開口を対向状態で設け、両挟持板が被縫製物を挟持した状態で前記両開口が略合致するようになし、又このように合致した状態で、第2の挟持板の内面に配置された永久磁石が前記第1の挟持板に吸着するようになし、これにより両挟持板間で被縫製物が挟持されるように構成するのがよい。或いは前記各装置において、前記第1の挟持板と第2の挟持板に縫製用の開口を対向状態で設け、両挟持板が被縫製物を挟持した状態で前記両開口が略合致するようになし、又このように合致した状態で、第2の挟持板の内面の前記開口の周縁部分に配置された永久磁石が前記第1の挟持板の開口の周縁部分に吸着するようになし、これにより両挟持板間で被縫製物が挟持されるように構成するのがよい。

【0019】前記各装置において、前記永久磁石は、前記第2の挟持板にのみ設けるのがよい。

【0020】又前記各装置において、前記NCマシンに開閉具を設け、該開閉具の開き方向の動作により前記第2の挟持板が開くようになすのがよい。該開閉具は、エアシリンダを以って構成するのがよい。

【0021】



【発明の実施の形態】以下、本発明の実施の形態を図面に基づいて説明する。

【第1の実施の形態】図1～3において本発明に係る装置1は、NCマシン2のテーブル面3上を、移動装置5に取着されて二次元方向で移動自在に設けられた永久磁石吸着方式の吸着保持具6と、その吸着を解除する吸着解除装置7とを具えている。

【0022】前記移動装置5は、前記テーブル面3の前後方向に伸縮し得る油圧シリンダ9のロッド10の先端に、左右に延びるガイドバー11の中央部を固定してなり、該油圧シリンダ9の伸縮に応じて該ガイドバー11が前後進F1できる。そして該ガイドバー11には、その左右方向に摺動可能な摺動部材12が設けられている。

【0023】然して、前記油圧シリンダ9の伸縮動作と前記ガイドバー11に沿う摺動部材12の左右動F2によって、前記吸着保持具6を、テーブル面3上で二次元方向に移動させることができる。この二次元方向の移動は、所定のプログラム制御によって自動的に行なわれるようになっており、これにより、前記吸着保持具6に保持された被縫製物13に、所要の縫製を施すことができる。なお前記移動装置5の駆動手段としては、位置制御が容易で且つ精度の高いパルスモータを採用するのがよい。

【0024】前記吸着保持具6は、図3～4に示すように、前記テーブル面3に載置された状態で該テーブル面上を所要に移動し得る例えば矩形板状の第1の挟持板15と、該第1の挟持板15の上に重なり合う例えば矩形板状の第2の挟持板16とを具えており、該第1の挟持板15の基端部17は、前記摺動部材12の下端部19に固定されている。そして前記第2の挟持板16の基端側20は、前記第1の挟持板15の基端側21（本実施の形態においては摺動部材12とこれに突設された突出片18とを介在させて構成されている）に蝶番22で枢着されて開閉可能となされており、両挟持板15、16が重なり合った状態で、夫々の挟持板15、16の左右側に設けた円形の開口23、23、25、25が合致するようになされている。前記両挟持板15、16は、例えばステンレス板からなる。

【0025】又前記摺動部材12の上端部には、図3、図7に示すように、所要間隔をおいて支持片26が設けられており、エアシリンダ等としての開閉用シリンダ27の上端に設けた連結片29が、該開閉用シリンダ27が垂直面内で傾動可能となるように枢着されている。又、各開閉用シリンダ27のロッド30の先端に設けた連結部31が、前記第2の挟持板16の基端側部分の上面に突設した支持片32に枢着されており、各開閉用シリンダ27が同時に縮小することによって、第1の挟持板15に重なり合った状態にある第2の挟持板16が図4に示すように開くように構成されている。

【0026】又前記第1の挟持板15の上面33には、図4に示すように、前記開口23の周縁部分で円環状薄肉クッションシート35が貼着されると共に、前記第2の挟持板16の下面36には、前記円形の開口25の周縁部分に図5～6に示すように、円弧板状の永久磁石37が所要角度ピッチで固設されると共に、その表面39が、前記と同様の円環状薄肉クッションシート40で覆われている。従って、前記開閉用シリンダ27が縮小して第2の挟持板16が開いた状態で、前記第1の挟持板15上に、布地としての被縫製物13を図6～7に示すように載せることができる。その後、前記開閉用シリンダ27を伸長させて両挟持板15、16相互を図3に示す重なり状態にすると、前記永久磁石37の吸着によって、図6に示すように、前記被縫製物（布地）13が両挟持板15、16間で挟持され、該被縫製物（布地）13は吸着保持具6に安定的に保持された状態となり得る。

【0027】又前記第2の挟持板16の先側部分の両側の上面には、図3～6に示すように、エアシリンダ等としての解除用シリンダ41、41が固設されており、該解除用シリンダ41のロッド42の先端部分として構成された突出体43が、該解除用シリンダ41の伸長によって、前記第2の挟持板16に設けた挿通孔45を通して前記第1の挟持板15に向けて突出可能となされている。そして、左右の解除用シリンダ41、41の同時伸長によって突出体43、43が突出して前記第1の挟持板15を押圧することにより、図9に示すように、前記重なり状態で一体化されている両挟持板15、16の間隔が拡大されて（第2の挟持板16が浮き上げられて）、前記永久磁石37の吸着が解除されるようになされている。

【0028】この解除された状態で、前記開閉用シリンダ27の全てを同時に縮小させることにより、前記第2の挟持板16を図9に示すように開かせることができる。

【0029】以上の構成を有するNCマシン2と吸着保持具6と吸着解除装置7等の作用を次に説明する。

【0030】先ず図7、図6に示すように、各開閉用シリンダ27が一斉に縮小して第2の挟持板16が開いた状態で、前記第1の挟持板15上に、前記開口23、23を覆う如く、布地としての被縫製物13を載せる。その後図8に示すように、開閉用シリンダ27を伸長させて第2の挟持板16を閉じると、前記永久磁石37の吸着によって、前記被縫製物13が両挟持板15、16間で安定的に挟持された状態となる。この状態で、前記移動装置5をプログラム制御によって所要に移動させると、被縫製物13を保持した前記吸着保持具6は、テーブル面3上で二次元方向に所要に移動することになる。この移動により図1に示すように、前記NCマシン2が、上下合致した前記開口23、25の内周縁44に沿

って縫製28する。

【0031】所要の縫製が完了した後、左右の解除用シリンダ41、41を同時に伸長させ且つ各開閉用シリンダ27を同時に縮小させると、図9に示すように、該左右の解除用シリンダ41、41の伸長に伴い前記突出体43、43が第1の挟持板15に向けて突出して該第1の挟持板15を押圧し、第2の挟持板16の先端部分46が、例えば15mm程度浮き上げられる。両挟持板15、16間の間隔の拡大によって、前記永久磁石37の吸着が解除されることになる。そして、その後の前記開閉用シリンダ27の縮小により、第2の挟持板16は容易に開かれる。

【0032】なお、前記解除用シリンダ41を伸長させることなく前記開閉用シリンダ27を縮小させんとするときは、両挟持板15、16が前記開口の周縁部分で永久磁石37により吸着されているために、第1の挟持板15も同時に浮き上がる傾向となり、第2の挟持板16を開くことが極めて困難となる。そこで本発明においては、前記解除用シリンダ41の伸長によって前記永久磁石37の吸着を解除した後に開閉用シリンダ27を縮小20させることとし、これにより、第2の挟持板16の開き動作を極めて容易としているのである。

【0033】そして、図7に示すように第2の挟持板16を開いた状態で、縫製された物を吸着保持具6から取り外し、新たな被縫製物を前記と同様に第1の挟持板15上に載せ、前記と同様工程で縫製を開始する。

【0034】〔第2の実施の形態〕図10～12は、本発明に係る装置1の他の態様を示すものであり、前記移動装置5及び前記吸着保持具6は、第1の実施の形態における同様の構成を有している。

【0035】本実施の形態においては、吸着保持具6が、第1の挟持板15と第2の挟持板16との間に布地等としての被縫製物をセットする際或いは縫製された物を取り外す際に、前記テーブル面3上の所要位置、例えば図10に示すコーナ部分47に移動する。そして前記第1の挟持板15の先側部分の両側には、図12に示すように、挿通孔部49、49が設けられ、又前記NCマシン2のテーブル50には、前記挿通孔部49、49と位置合わせして解除用シリンダ41、41が設けられている。又、該解除用シリンダ41のロッド48の先端部分として構成された突出体51が、前記挿通孔部49を通して上方向に突出するようになされ、図13に示すように、該突出体51が前記挿通孔部49を通して突出して前記第2の挟持板16を浮き上げることにより、永久磁石37の吸着が解除されるようになされている。

【0036】所要の縫製が完了した後、左右の解除用シリンダ41を同時に伸長させ且つ各開閉用シリンダ27を同時に縮小させると、前記のように、突出体51、51の突出によって前記永久磁石37の吸着が解除され、その後における開閉用シリンダ27の縮小により、図1 50

4に示すように第2の挟持板16は容易に開かれることとなる。

【0037】〔第3の実施の形態〕図15～16は、本発明に係る吸着解除装置7のその他の態様を示すものであり、移動装置5及び吸着保持具6は、第1の実施の形態における同様に構成されている。

【0038】そして、前記一体化状態にある両挟持板15、16の端縁の合わせ目52に、例えば楔状をなす割り込み突出体53が、両挟持板15、16間の間隔を拡大させる如く進入可能となるように、前記NCマシン2に付設されている。該割り込み突出体53は、先端が先細となる断面三角形状に形成されており、これが前記合わせ目52へ、例えばシリンダの伸長により割り込み進入することによって、前記永久磁石37の吸着が解除されるように構成されている。

【0039】そして該吸着解除状態において、前記と同様、開閉用シリンダ27を縮小させることによって第2の挟持板16を容易に開くことができる。

【0040】〔その他の実施の形態〕

(1) 本発明を構成する吸着保持具は、第1の挟持板と第2の挟持板との間で被縫製物を挟持可能に構成され、永久磁石の吸着により両挟持板相互が重なり状態で一体化できるものであれば、該永久磁石は、挟持板の一方にだけ設ける場合の他、双方に設けることもある。又その永久磁石は、前記のように開口の周縁部分に設けることその他、両挟持板を吸着により重なり状態で一体化できる限り、永久磁石の配置状態は任意に設定できる。しかし、テーブル面上を移動できる第1の挟持板15に永久磁石を設ける場合は、該永久磁石の吸着によって、吸着保持具のテーブル面上における動きを悪くしないように配慮する必要がある。

【0041】(2) 吸着保持具を取着するための移動装置は、前記実施の形態で示したもの他、該吸着保持具をテーブル面上で二次元方向に移動させ得る各種の構成を採用することができる。

【0042】(3) 第1の挟持板と第2の挟持板は、その一方又はその双方に設けた永久磁石の吸着により重なり状態で一体化され得るものであるならば、該挟持板の材質は、前記のようなステンレス板に限られるものではなく各種の磁性板を採用できる。

【0043】(4) 前記永久磁石の吸着を解除する突出体を突出させる手段は、エアシリンダ等のシリンダを用いる手段の他、電磁石等を用いる手段であってもよい。又この突出体は、挟持板の両側に配置するのが、吸着解除をバランスよく行なうことができて好ましいが、吸着解除を行ない得る限り、挟持板の中央部分で行なうもの等、各種に位置設定できる。

【0044】(5) 被縫製物を保持する第1の挟持板と第2の挟持板は、前記実施の形態におけるように、その基端側相互を開閉可能に連結するのが好ましいが、第1の

挾持板が第2の挾持板に対して平行状態を保ったまま離間するように構成することもできる。又第2の挾持板を開く手段は、前記開閉用シリンダを用いて行なうものの他、ワイヤやリンク装置を用いて引き上げる手段、更には手動で開く手段も採用できる。

【0045】(6) 第1の挾持板に、上方向に突出する突出体を挿通させる挿通孔部を設ける場合、該挿通孔部は、閉じた孔として形成することの他、欠切状の挿通孔部として形成することもある。

【0046】(7) 前記実施の形態で示すように、両挾持板15、16に開口を設ける場合、該開口は、前記した円形に形成することの他、所望縫製形態に合わせて各種に構成することができる。又、かかる開口を有さないものとして構成することもできる。

#### 【0047】

【発明の効果】本発明は以下の如き優れた効果を奏する。

(1) 本発明に係る装置によるときは、被縫製物の保持を、永久磁石の吸着によって第1、第2の挾持板間で簡易に行なうことができると共に、所要の縫製を、被縫製物を確実に保持した状態で安定的に行なうことができる。

【0048】(2) 又永久磁石の吸着状態を、前記突出体の突出に伴う両挾持板間の間隔の拡大や第2の挾持板の浮き上げ、或いは両挾持板の端縁の合わせ目への割り込み突出体の進入によって容易に解除することができ、これらにより、第2の挾持板を難無く開くことができる。かかることから本発明によるときは、吸着保持具がNCミシンの移動装置に装着されたままの状態（吸着保持具に対する被縫製物のセットや、縫製された物を吸着保持具から取り外す作業を、被縫製物が大きなものであっても障害なく行ない得ることとなる。従来手段によるときは、前記のように、NCミシンのテーブルと作業台間で被縫製物の保持具を移動させなければならないといった面倒で手間のかかる作業を要したのであるが、本発明によるときはこのような問題を解消できる。又従来においては、作業者の労力負担を考慮して、保持具を大きなもの（重量がある）に設定できない問題があり、従って、大きな布地等の被縫製物はセットし難い問題があったのであるが、本発明によるときは、大きな布地等の被縫製物であっても作業者に負担をかけることなくセットでき、小物から大物まで各種の被縫製物に対して所要の縫製を施すことが可能となるのである。以上要するに、本発明によるときは、作業手間や労力を削減して縫製作業能率を向上させることができると共に、縫製コストの低減を期し得ることとなる。

【0049】(3) 又本発明によるときは、吸着保持具がNCミシンの移動装置に装着されたままの状態（吸着保持具を移動装置から取り外すことを要さずして）、吸

着保持具に対する被縫製物のセットや、縫製された物を吸着保持具から取り外す作業を行ない得ることから、従来のような独立した作業台を必要とせず、縫製作業上の省スペースを図ることができる。

【0050】(4) 本発明においては、両挾持板の吸着を、電磁石ではなく永久磁石を用いて行なうため、吸着手段を安価に構成できるばかりでなく、永久磁石は電磁石に比べて軽量であるために、吸着保持具をテーブル面上で移動させる移動装置に負担がかからない利点もある。

【0051】(5) 第1の挾持板と第2の挾持板を、その基端側で開閉可能に枢着すると共に、第2の挾持板の先側部分の両側に位置させて突出体を設ける構成を採用し、或いは第1の挾持板の先側部分の両側において、上方向に突出する突出体を設ける構成を採用したときは、永久磁石の吸着解除をバランスよく容易に達成できる利点がある。

【0052】(6) 第1の挾持板と第2の挾持板を吸着させる永久磁石を、テーブル面上に直接載置される第1の挾持板ではなく、その上に重なり合う第2の挾持板にのみ設ける場合は、テーブル面に対する永久磁石の吸着力を極力小さくでき、これにより、テーブル面上における吸着保持具の二次元方向での動きをより円滑に達成できることになる。

#### 【図面の簡単な説明】

【図1】本発明に係る装置の全体構成を説明する平面図である。

【図2】NCミシンの縫製部を示す斜視図である。

【図3】吸着保持具と吸着解除装置を示す斜視図である。

【図4】吸着保持具の第2の挾持板を開いた状態を示す斜視図である。

【図5】第1の挾持板に設けられた永久磁石の配置状態を示す斜視図である。

【図6】吸着保持具が被縫製物を吸着保持した状態を示す部分断面図である。

【図7】第2の挾持板が開いた状態を示す断面図である。

【図8】第2の挾持板が閉じた状態を示す断面図である。

【図9】吸着解除装置の突出体が突出して吸着が解除された状態を示す断面図である。

【図10】本発明に係る装置の他の態様を示す平面図である。

【図11】吸着保持具が被縫製物を吸着保持した状態を示す断面図である。

【図12】テーブルに設けた吸着解除装置を説明する斜視図である。

【図13】その吸着解除装置の突出体が突出して吸着が解除された状態を示す断面図である。

【図14】第2の挟持板が開いた状態を示す断面図である。

【図15】吸着解除装置の他の態様を示す断面図である。

【図16】吸着解除装置が吸着を解除した状態を示す断面図である。

【図17】従来装置を説明する平面図である。

【図18】従来装置に用いる開閉式保持具を示す斜視図である。

【符号の説明】

- 1 装置
- 2 NCミシン
- 3 テーブル面
- 5 移動装置
- 6 吸着保持具

\* 7 吸着解除装置

13 被縫製物

15 第1の挟持板

16 第2の挟持板

23 開口

25 開口

27 開閉用シリンダ

37 永久磁石

41 解除用シリンダ

10 43 突出体

49 挿通孔部

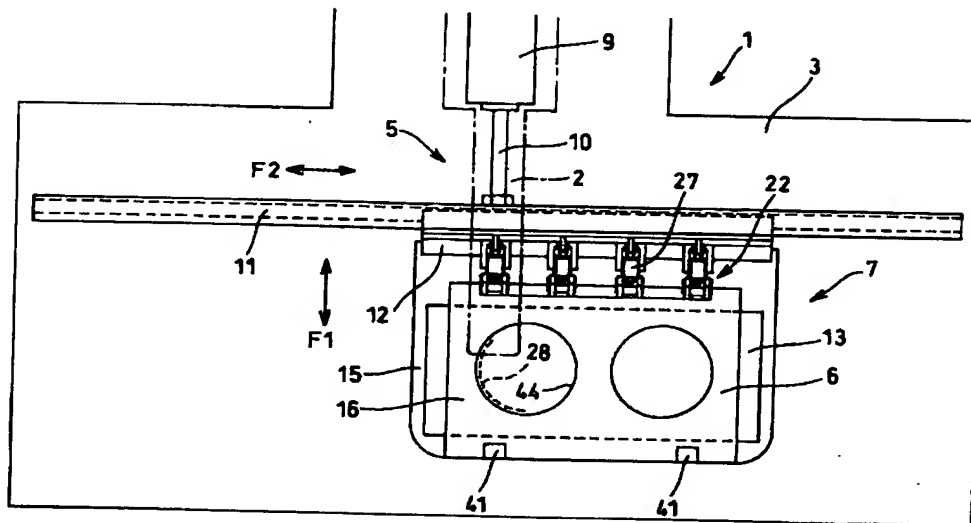
50 テーブル

51 突出体

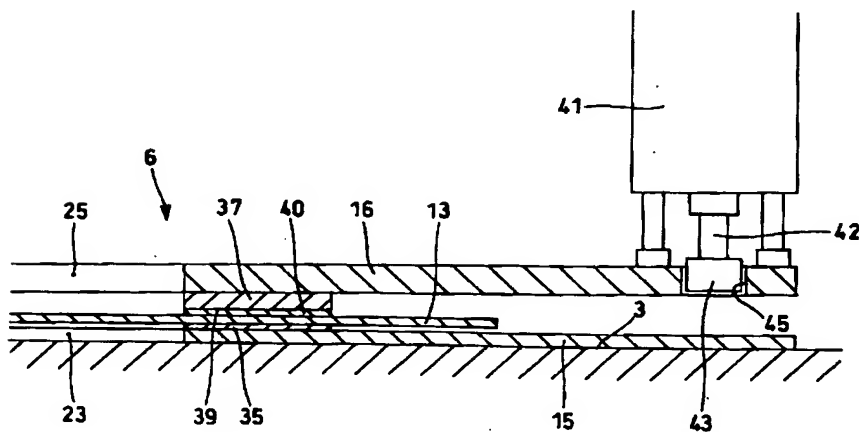
52 合わせ目

\* 53 割り込み突出体

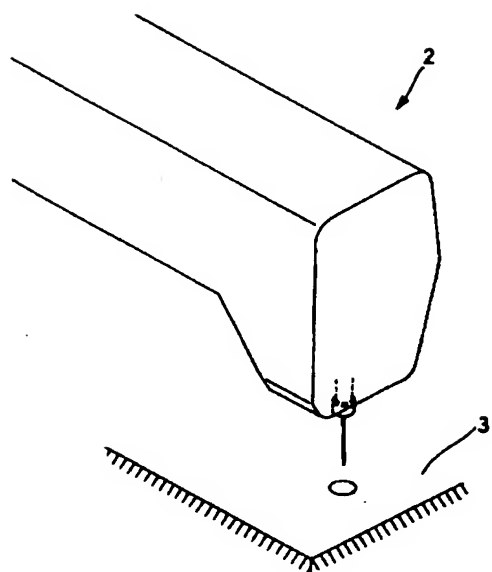
【図1】



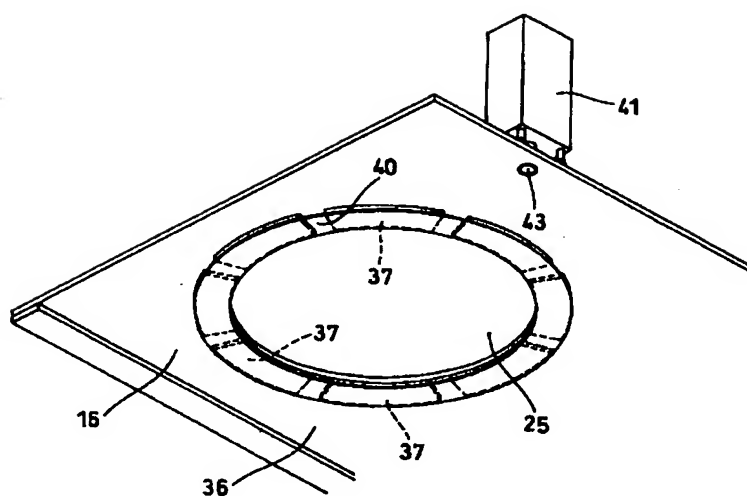
【図6】



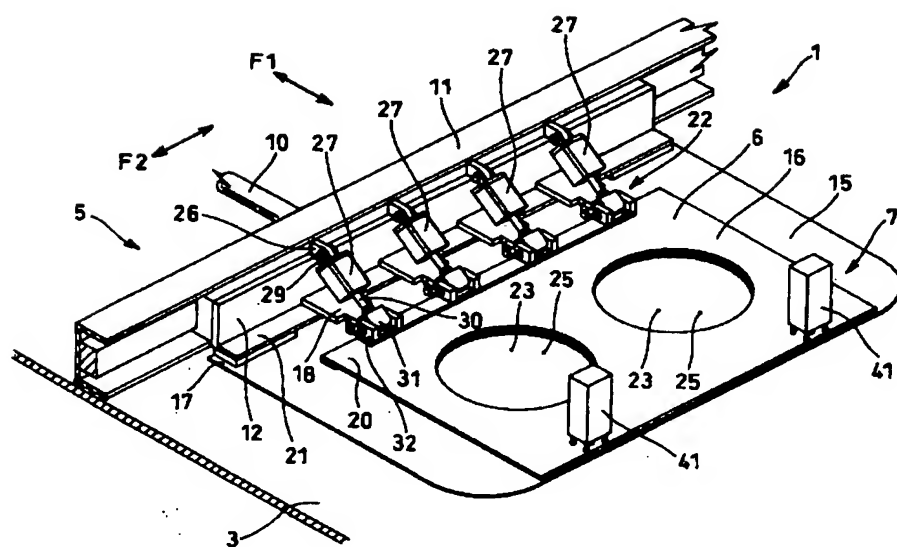
【図 2】



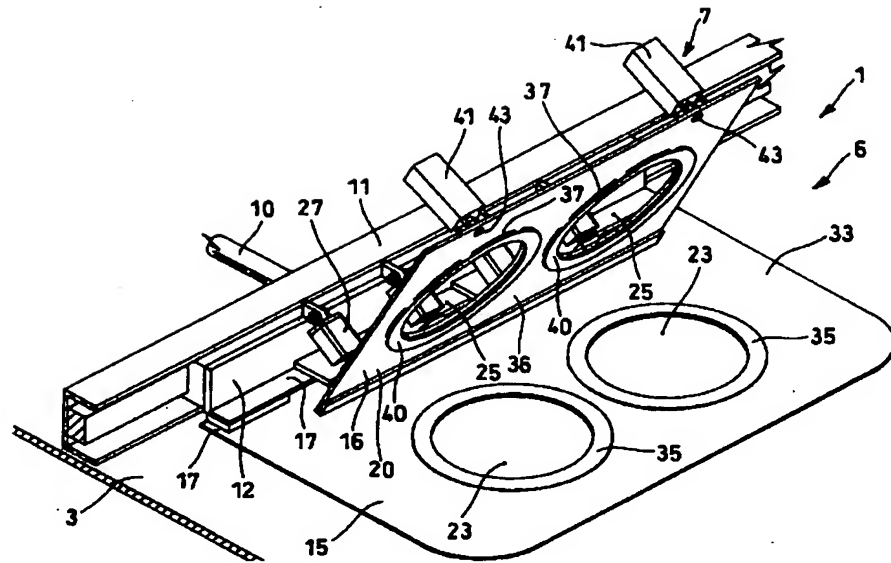
【図 5】



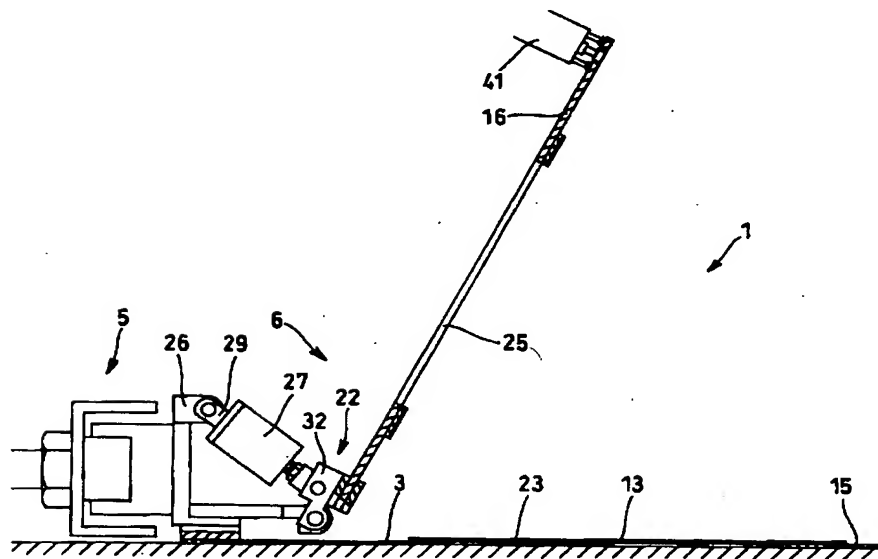
【図 3】



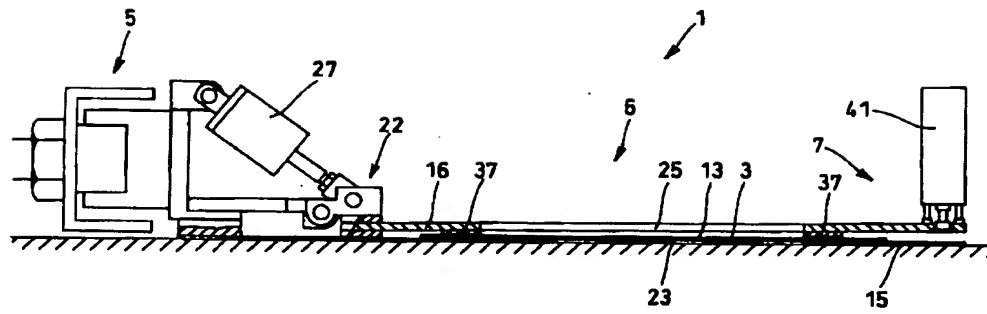
【図 4】



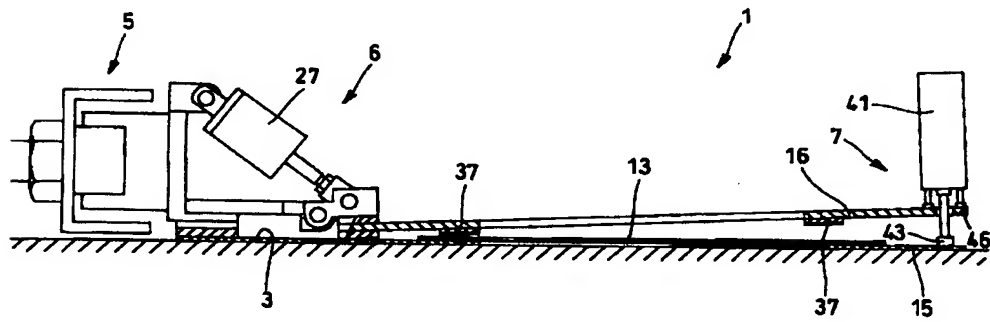
【図 7】



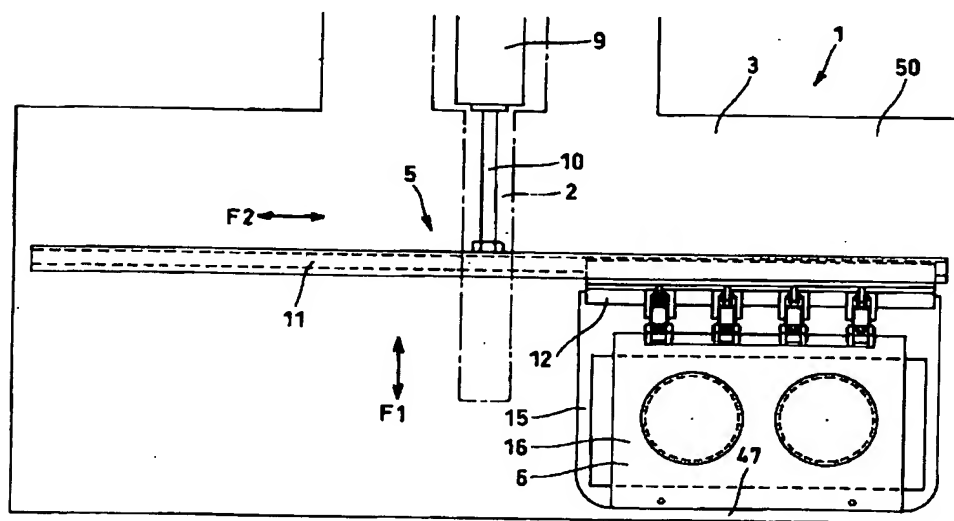
【図8】



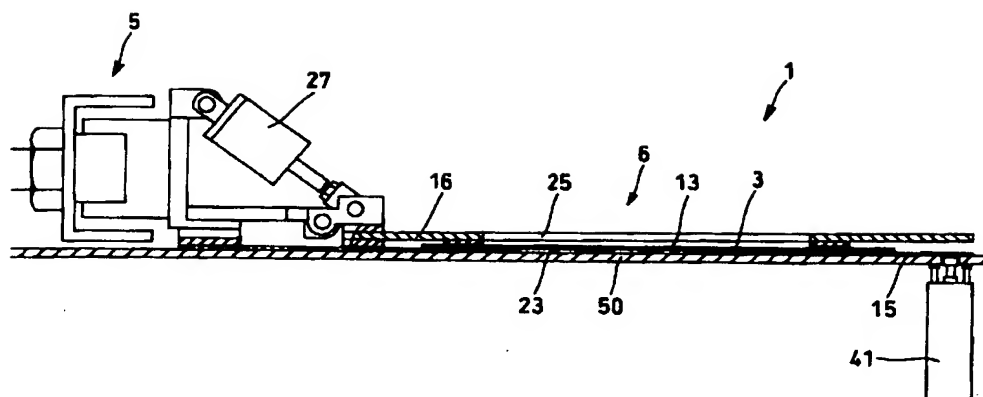
【図9】



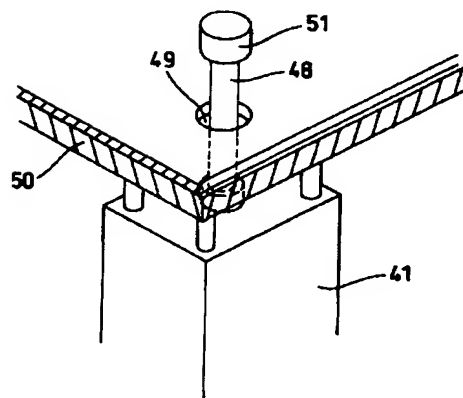
【図10】



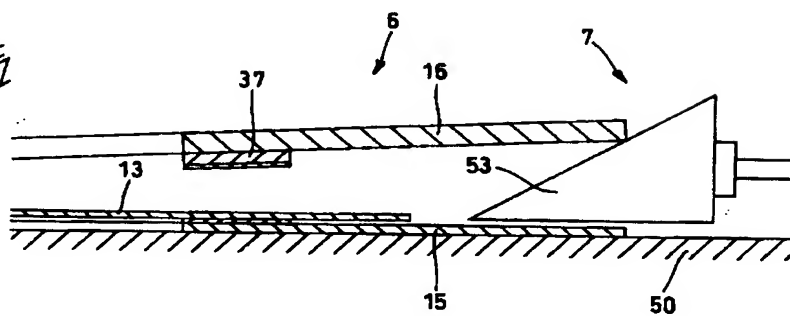
【図 11】



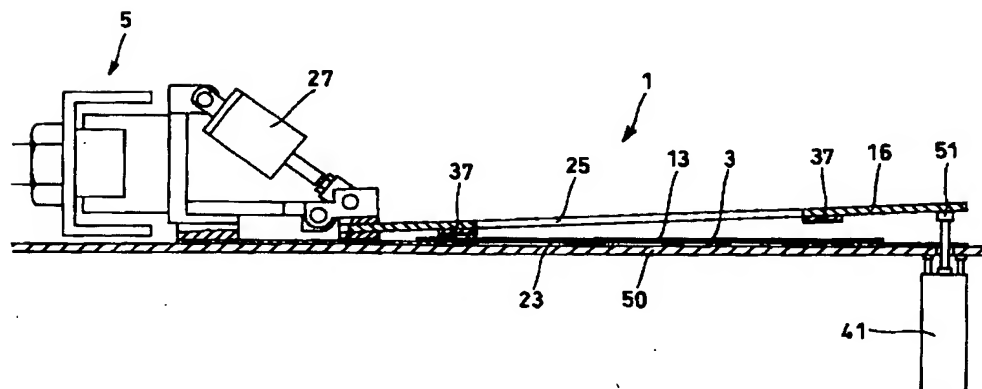
【図 12】



【図 16】

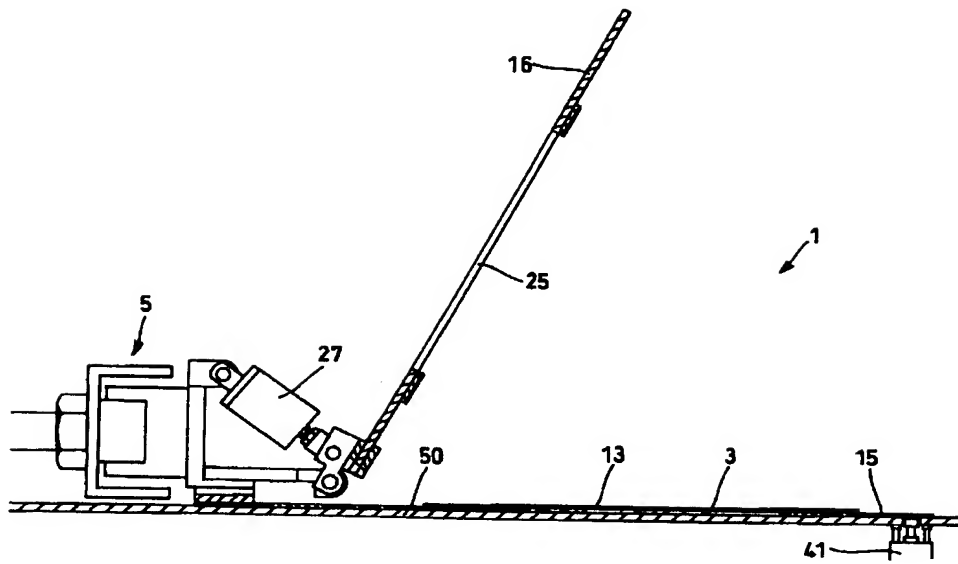


【図 13】

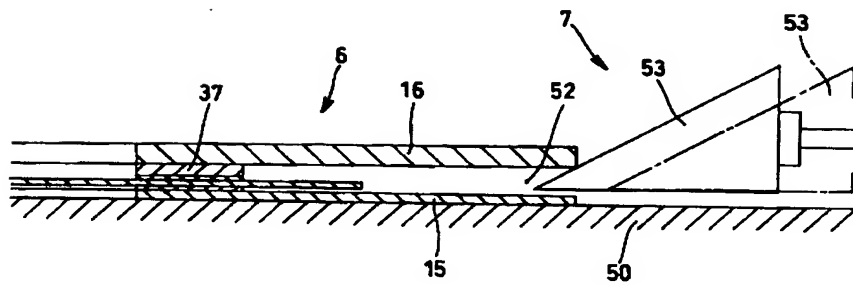




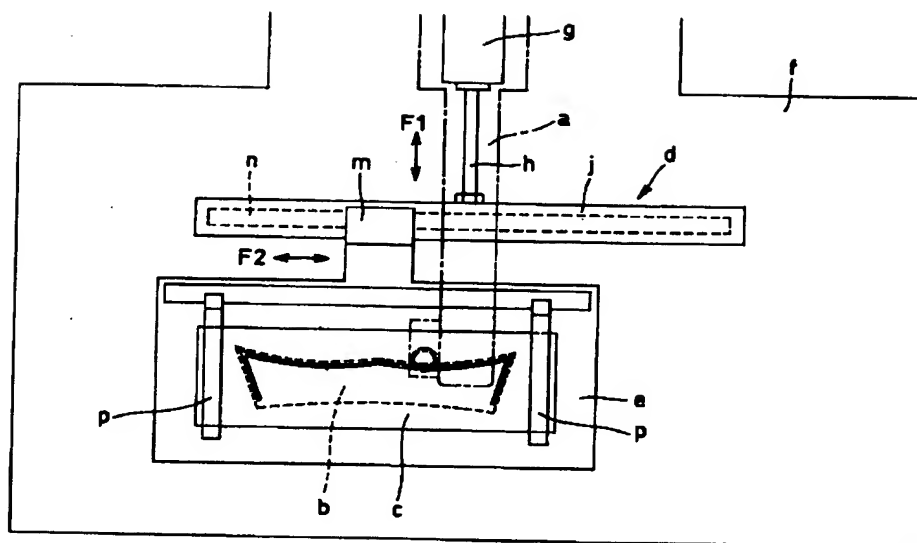
【図 14】



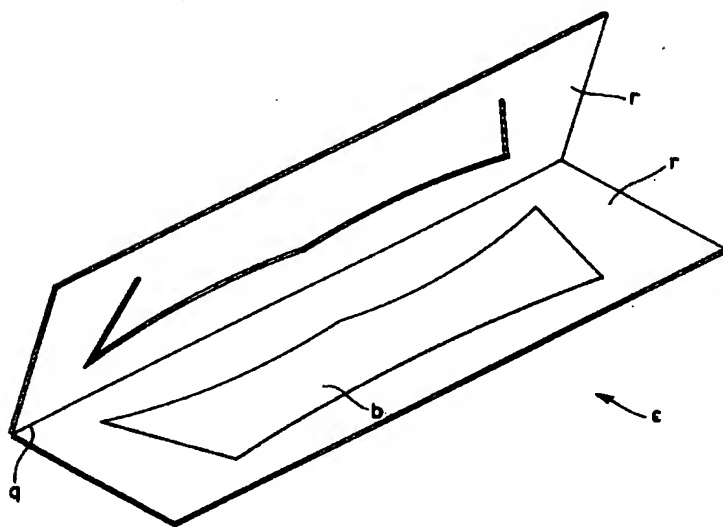
【図 15】



【図17】



【図18】



フロントページの続き

(72)発明者 長谷川 克人  
 福井県大野市元町3番19号 株式会社松屋  
 アールアンドディ内

Fターム(参考) 3B150 AA15 BA01 CC01 CE02 CE23  
 CE27 EB03 EB07 EB13 HA10  
 JA07 JA13  
 3D054 CC27 CC30 FF17